$5.00 a Year FORESTRY Published Monthly 50c a Copy

VETERINARY MEDICINE

OCTOBER CONTENTS 1947

Veterinary Progress, Policies and Comments

Brucellosis in Slaughtered Swine, 355; Revision of U. S. Pharmacopeia, 355; New Veterinary College in Quebec, 356; Civil Service Appointments without Examinations, 356; Illinois Inaugurates Graduate Veterinary Instruction, 356; Federal Meat Inspection now under Fee System, 356; Additional Veterinary Corps Officers Separated from the Service, 357; Drs. Sunderville and Milks Retire from Faculty of New York State Veterinary College, 357; Dissemination of Foot-and-Mouth Disease, 358; 1947 A. V. M. A. Awards, 359; Officers for 1947-1948 of A. V. M. A., Women's Auxiliary and Newly Organized Women's Veterinary Medical Association, 359; Dr. L. M. Hurt, President Elect, and Dr. W. A. Hagan President of A. V. M. A., 360; Veterinary Exhibitors Association, 361; Foot-and-Mouth Disease in Deer, 361; National Veterinary Examining Board, 362; Army Veterinary Legislation, 362; Worthless Remedies, 362; Successful Veterinary Authors, 369; Magnitude of Army Food Inspection, 374.

The Treatment of Equine Influenza 363

Collection of Semen by Means of the Urethral Fistula ... 367

Regulations for Artificial Insemination 370

DDT Spray Outmodes Dipping Vat 372

Use of Sodium Sulfamerazine in Foot Infections in Cattle 374

The Fight Against Foot-and-Mouth Disease in Europe 377

Hemorrhagic Septicemia in Swine Controlled with Sodium Sulfamethazine 379

Cardiac Disease in Dogs and Cats Successfully Treated with Vitamin E 382

Use of Gelatin Solution as Plasma Replacement Therapy 384

Veterinary Problems of the Fur Ranch 388

Clinical Reports 389-392

Large Cystic Calculus in a Young Dog, 389; Empyema of the Frontal Sinus in a Cow, 389; Ethyl Mercury Phosphate Poisoning in Cattle, 390; Newly Found Strongyloides Species, 390; Prevent Unnecessary X-ray Exposure, 391; Feline Gastrotomy, 392.

Book Reviews 393-394

History and Romance of the Horse, 393; Diseases Transmitted from Animals to Man, 393; Milk and Food Sanitation Practice, 393; Housebreaking the Dog, 394; Bulletins, Circulars etc., 394.

VOL. XLII
No. 10

Entered as second-class matter Nov. 8, 1920, at the post office at Chicago, Ill., under the Act of March 3, 1879.

7632 S. Crandon Ave.
Chicago 49, U.S.A.

Protection...

WITHOUT LIVE VIRUS HAZARDS

Jen-Sal

HOG CHOLERA VACCINE

Crystal Violet

BLOOD ORIGIN

A sterile non-viable, true vaccine that meets the strict U.S.B.A.I. live pig test for potency . . . Available to the veterinary profession only, Jen-Sal "Crystal Violet" confers protection of eight months or more duration on swine of all ages—except pigs weaned less than two weeks—by a single and inexpensive 5 cc dose, without risk of virus-borne premise infection or reaction hazards.

Vial 60 cc (12 doses) $6.00
Code: VIVAC

Vial 250 cc (50 doses) $25.00
CODE: VILET

JENSEN-SALSBERY
KANSAS CITY, MISSOURI *Laboratories, Inc.*

VETERINARY MEDICINE

Registered in U. S. Patent Office

VOL. XLII OCTOBER, 1947 No. 10

Published Monthly by the

VETERINARY MAGAZINE CORPORATION

7632 S. CRANDON AVE., CHICAGO 49, ILL., U.S.A.

$5.00 a year; per copy 50 cents

All matter appearing in this publication is copyrighted. No part of it may be reproduced without specific permission. Permission will be given if the purpose is unobjectionable. If there be any question as to the proprietary of reproduction the author will be consulted.

Entered as second-class matter Nov. 8, 1920, at the post office at Chicago, Ill., under the Act of March 3, 1879. Entered as second-class matter under the title of American Journal of Veterinary Medicine July 19, 1910, at Chicago, Ill.. under the Act of March 3, 1879.

D. M. CAMPBELL, *Editor*
7632 S. Crandon Ave., Chicago 49, Ill.
Telephone South Shore 7160

H. J. MOSTYN, *Eastern Representative*
P. O. Box 391, Dover, New Jersey
Telephone Dover 6-2711W.

COPYRIGHTED, 1947, BY VETERINARY MAGAZINE CORPORATION

Of 6252 freshmen in U. S. medical schools, 4399 male veterans and 47 women veterans are enrolled.

The 13th revision of the U. S. Pharmacopeia has been published. The U.S.P. is now revised every five years instead of at decennial periods as were the first 12 editions.

From 1 to 3% of the swine slaughtered in our packing houses have brucellosis. Sometimes this disease does no harm and causes no economic loss; sometimes it destroys all chance of profit from the herd.

All cell growth takes place in the immediate vicinity of the nucleus, according to Prof. Paul Weiss, University of Chicago. Nerve cells are a good example of this. Worn out substance in even the longest nerve is replaced from the nucleus of the cell of which the nerve is an integral part. Nerves increase in length in the same way, *i.e.*, by migration of new material from the cell nucleus.

A second prize of $1,000 is to be offered annually by the American Association for the Advancement of Science. This is in addition to the A.A.A.S. Westinghouse Science Writing award which goes each year to a paper presented at a scientific session. The award for 1946 went to a writer who described the work of Karl Meyer,[1] Director of the George Williams Hooper Foundation for Medical Research.

The new award will include science writers for magazines as well as newspapers.

[1] *Vet. Med.*, 42:2, p. 44. 1947.

The British Ministry of Food has announced that soon a percentage of whale meat will be incorporated in all sausage to extend the meager meat ration.

The cost of staging the scientific exhibits at the recent centennial meeting of the American Medical Association is estimated to have been between three and five million dollars.

The cost of operating the medical schools of this country, exclusive of their teaching hospitals, will be somewhat more than $43,000,000 for the academic year 1947-1948. Less than one-third of this sum will be obtained from student fees.—*J. Am. Med. Assn.*

When brucellosis is suspected in a herd of swine, all animals in the breeding herd should be given the agglutination test, using the same antigen and the same methods as for cattle. If any swine in the herd agglutinate in a high titer all that react at 1:25 and above should be considered to be infected. If no animals run a titer higher than 1:200 the herd should be regarded as non-infected.

Hazford Rupert 81st, sire of nearly $1,000,000 worth of famous calves, has been placed in a limestone tomb on the ranch of Governor Roy J. Turner of Oklahoma. A monument will be raised on the spot to commemorate the one-time international champion bull whose blood line became one of the most sought after in the country. The 13-year-old champion was put to death because of crippling arthritis. Gov. Turner had purchased the animal in 1937. Subsequently the bull sired 496 calves.—*Natl. Provisioner.*

New Veterinary College in Quebec

With the opening of the new provincial veterinary college at Saint Hyacinthe, Quebec, the old school at Latrappe will be closed. The new college will open with the beginning of the school year in October.

The new school like the old will be affiliated with the University of Montreal. Unlike the old institution it will be a provincial college and will operate under the supervision of the Minister of Agriculture of the Province of Quebec.

Professor Gustave Labelle, former Director of École de Médecine Vétérinaire at Latrappe, has been appointed Director of the new college. The names of other members of the faculty will be announced soon. The school will open in temporary buildings. Construction on new buildings will commence soon.

Civil Service Appointments Without Examination

The United States Civil Service Commission has announced a Veterinarian examination for filling positions at salaries of $2,644 and $3,397 a year, in Washington, D. C., and throughout the United States, principally in the midwest section of the country. The majority of the vacancies exist in the Bureau of Animal Industry of the U. S. Department of Agriculture. The recent outbreak of hoof-and-mouth disease among cattle in Mexico has made it necessary that more veterinarians be employed by this Bureau so that adequate safeguards may be taken to prevent the spread of the disease into this country.

No written test is required. To qualify for these positions, applicants must have completed a full course of study in veterinary medicine in a college or university of recognized standing. Students of veterinary medicine who expect to complete their courses within 6 months may apply for the $2,644 positions, but may not enter on duty until they furnish proof of completion of the required courses. No experience is necessary for the $2,644 positions. For the $3,397 positions, applicants must have had 1 year of professional veterinary work in addition to the educational requirement. One year of graduate study in the field of veterinary medicine may be substituted for the required year of experience

Full information and application forms may be secured at most first- and second-class post offices, from Civil Service Regional Offices, or from the U. S. Civil Service Commission, Washington 25, D. C. Applications will be accepted in the Commission's Washington office until further notice.

Illinois Inaugurates Graduate Veterinary Instruction

A graduate teaching and research center was authorized for the College of Veterinary Medicine Tuesday, Aug. 5, when the Board of Trustees of the University of Illinois voted $80,000 for purchase and remodeling of a property, formerly a men's rooming house, to be used as temporary office quarters for staff members and for a part of the research work and graduate teaching in the College until its new buildings are erected. Diagnostic, autopsy and clinic facilities will remain in the present Veterinary Pathology Laboratory. The new property will be remodeled for student laboratories, classrooms and library room together with administrative, staff and stenographic offices. No animals will be kept in the new research center.

Housing of staff members and research workers will be solved temporarily by this expansion, but the major problem—the activation of professional training of veterinarians at Illinois—cannot begin until adequate building and equipment facilities are provided for undergraduate instructional purposes.

Federal Meat Inspection Now Under Fee System

Federal inspection of meat, which heretofore has been paid for from public funds, is now under a system of fees to be paid by packers, who receive this Government service.

Under the new system, the federal Bureau of Animal Industry will pay its inspectors as in the past, but will collect the cost from each establishment served. The inspectors will be selected and appointed under U. S. Civil Service procedures, as heretofore, and will retain all Civil Service rights. The current charge for inspection during customary working hours will be $89.60 per man-week, payable every four weeks. This amount represents the services of one man for a 40-hour week. For service on a holiday, occurring from Monday through Friday, an additional charge of $1.64 per man-hour is made, and for overtime during those days of the week the additional charge is $2.58 per man-hour. There are special rates and provisions, including a requirement for ample advance notice, when inspection is desired at night, on Sundays, or other unusual times.

In recent years the cost of Federal meat inspection, as paid from public funds, has totalled about $11,000,000 annually. Department officials point out that this amount is less than 10 cents a year per person in the United States, or considerably under a cent a month. Thus, even if the entire cost of inspec-

tion were passed along to consumers, it should have an exceedingly small influence on the price of meat. Or if the cost were divided among the millions of animals inspected annually, the new system should have no material effect on prices paid producers for their livestock.

Department officials give assurance that the same thoroughness and economy of inspection will prevail under the new system as in the past. Some adjustments in charges may be needed, they say, to meet changing seasonal or industrial requirements, but meat-inspection personnel will continue to be assigned and utilized in the most efficient manner possible. Though expecting that the new fee system may have some effect on the quantity of meat that will receive federal inspection, by comparison with former years, the officials regard the economic ramifications bearing on the point as exceedingly complex and not accurately predictable.

A survey by the *National Provisioner* indicates 90% of the medium and small packers will retain their inspection.

Dissemination of Foot-and-Mouth Disease

During the most widespread outbreak of foot-and-mouth disease in this country, October, 1914, to May, 1916, more than 172,000 animals in 22 states and the District of Columbia were affected. Altogether 3556 herds were involved. The probable source of the infection in more than 75% of them was determined.

First among the sources of infection was infected animals brought onto the premises from stockyards or farms and ranches. This accounted for the infection of 1600 herds. It was mainly a result of delay in diagnosis which permitted infection to get into the Union Stockyards in Chicago.

Livestock buyers, peddlers and farmers exchanging work and neighborhood visiting were responsible for the infection of 672 herds. Infected stock cars, contaminated feed and feed yards and highways and miscellaneous articles caused the infection of 411 herds. The probable source of infection in some 800 herds was not determined.

In the means by which the disease is spread, experience in the United States differs markedly from the history of foot-and-mouth-disease outbreaks in foreign countries. In other countries contaminated feed, chiefly garbage, has far exceeded all other sources of infection as a means of spreading the disease and of initiating outbreaks as well. The present outbreak in Mexico is thought to have been started by infected animals.

Extermination of Infected Wild Animals

Wild-animal eradication experts of the United States and Mexico are planning the slaughter of infected cloven-footed wild game within the main quarantined zone. Unless destroyed these animals, which are believed to be principally deer, antelope, and wild swine, may spread the virus to disease-free areas.

H. Nelson Elliott, one of the leading experts on wild game in the United States has joined the forces of the commission. For many years an employee of the wildlife service of the U. S. Department of the Interior, Doctor Elliott brings to the commission expert knowledge of the habits of wild game and the most effective ways of conducting the necessary extermination.

U. S. Buys Mexican Canned Meat

To aid in the solution of the acute marketing problem facing the owners of nine million cattle in northern Mexico the USDA has contracted with the Juarez Meat Products, Juarez, Mexico, for one million pounds of canned meat. It will be resold to the International Refugee Association for the feeding of refugees in Europe. It is expected the USDA will, in the coming months, purchase much larger quantities of canned meat in northern Mexico for resale outside the United States. It is believed the reduction in the number of cattle in the area which will result through these contemplated canning contracts, will make less likely the introduction of foot-and-mouth disease into the border states of Mexico.

Reports persist of complete understanding and cooperation between officials of the two nations on the commission. But the fact that 15,000 troops have been required to maintain the quarantine and various reports of friction on lower levels culminating in the murder of one veterinarian and six lay assistants by Mexican cattlemen September second indicate that, in the field, less harmony prevails.

The plain fact is, the eradication of this outbreak of foot-and-mouth disease is an exceedingly difficult task and, despite all the brave words coming from the two governments, the outcome, although it appears hopeful, is still in doubt.

But whether eradication succeeds or fails those who have been engaged in the work will have reason to be proud of the effort made and of many achievements—to have prosecuted this work vigorously in tropical jungles and on rugged, roadless mountain terrain, 2000 miles from the source of supplies; among an uninformed population and under great language difficulties (many of the cattle owners understand neither English nor Spanish) requires more than ordinary fortitude.

Veterinary Corps Officers Separated from the Service Since VE-Day

(Continued from last month)

Alabama

Lt. Robert S. Hill — Lt. H. M. Fulenwider
Capt. Thomas Elisha Head, Jr.

California

Capt. Jas. E. Anderson — Capt. W. L. Johnson
Capt. Robt. P. Beasley — Capt. J. S. Orsborn, Jr.
Capt. John B. Carricaburu, Jr. — Capt. Chester J. Potter
Capt. W. J. Schneider
Capt. Robt. E. Dullum — Capt. Orland A. Soave
Major Wm. W. Williamson

Colorado

Lt. W. J. Barngrover — Lt. Rowen D. Frandson
Capt. E. E. Eatinger — Capt. Robert D. Hause
Capt. Norman W. Eyl — Capt. R. H. Huffaker
Capt. Leslie D. Miller

Illinois

Lt. Col. James H. Allen — Capt. John L. Cox
Capt. Ernest Henry Stratmeyer

Indiana

Capt. D. B. Brattain — Capt. D. B. Schlosser

Iowa

Lt. Col. W. R. Anderson — Capt. R. L. Lundvall
Capt. D. G. DeValois — Capt. L. H. Pease

Kansas

Capt. J. H. Cheney — Capt. E. H. Stratham
Capt. Oral V. Combs — Capt. Lowell M. Webb

Maryland

Capt. Edmund H. James, Jr.

Massachusetts

Lt. Thomas J. Grennan, Jr.

Michigan

Capt. James A. Bell — Capt. Earl M. Milliman
Capt. D. J. Collins — Capt. K. C. Van Nocker
Capt. Norman T. Freid — Capt. Robt. J. Veenstra

Minnesota

Major Henry G. Voetberg

Mississippi

Capt. P. S. Livingston — Major J. S. Whitfield

Missouri

Capt. Clyde E. Brown — Capt. H. W. Dickmann
Capt. John A. Chapin — Capt. R. E. Hineman
Capt. Richard E. Hoadley

Nebraska

Capt. David A. Phillipson

New Jersey

Capt. John W. Moor

New Mexico

Lt. Lewis T. Ausherman

New York

Capt. T. C. Vaughn, Jr. — Capt. J. G. Woodcock

North Carolina

Capt. Robert E. Baucom

Ohio

Capt. Robert C. Adams — Capt. H. E. Newhouse, Jr.
Capt. Chas. D. Diesem
Capt P. W. Hitesman — Capt. Fred A. Nichols
Lt. Merle A. Mallo — Capt. Jewell Neil Ross
Capt. Robt. W. Menges — Capt. R. W. Worley

Oklahoma

Capt. Herman P. Grueter

Oregon

Capt. Sanford E. Davis

Pennsylvania

Capt. C. E. Mootz, Jr. — Capt. James M. Penny

South Carolina

Capt. I. R. Cooper, Jr. — Capt. E. J. Kellett, Jr.

Texas

Lt. James L. Cross

Virginia

Capt. Oscar L. Boyd — Capt. L. W. Thompson

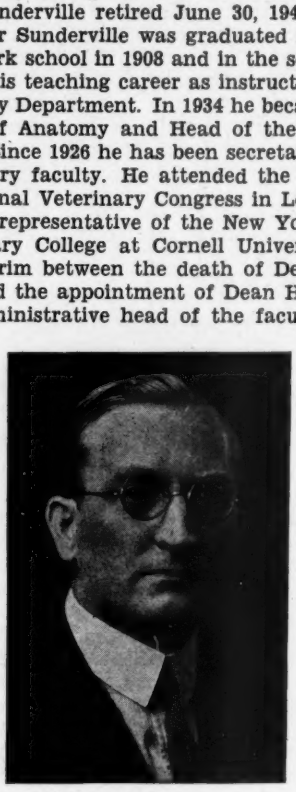
Wisconsin

Capt. Robert H. Romaker

Dr. Earl Sunderville Retired

Professor and head of the Anatomy Department and Secretary of the New York State Veterinary College at Cornell University, Dr. Earl Sunderville retired June 30, 1947.

Doctor Sunderville was graduated from the New York school in 1908 and in the some year began his teaching career as instructor in the Anatomy Department. In 1934 he became Professor of Anatomy and Head of the Department. Since 1926 he has been secretary of the veterinary faculty. He attended the 11th International Veterinary Congress in London in 1930 as representative of the New York State Veterinary College at Cornell University. In the interim between the death of Dean P. A. Fish and the appointment of Dean Hagan he was administrative head of the faculty.



HOWARD J. MILKS

With his retirement from the position of Professor of Materia Medica and Director of the Small Animal Clinic in the New York State Veterinary College at Cornell University June 30, 1947, Dr. Howard Jay Milks closed a career in veterinary teaching that had extended over more than 40 years. Graduating from the New York State Veterinary College in 1904, Doctor Milks spent two years as animal pathologist of the Louisiana Agricultural Experiment Station and six years as assistant professor of materia medica and therapeutics in his alma mater, becoming head of the department and director of the small animal clinic in 1914, which positions he has since held. He is the author of a Laboratory Guide to Materia Medica and Pharmacy, 1916; Practical Veterinary Pharmacology, Materia Medica and Therapeutics, 1917; and a large number of articles in veterinary periodicals. He edited three special issues of this magazine—April, 1929, November, 1931, and March, 1934.

Two of Doctor Milks' three sons are veterinarians.

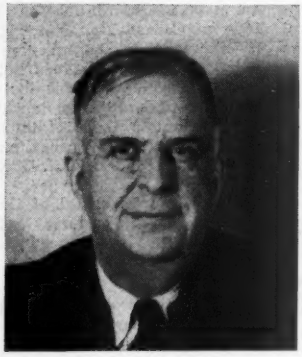
Cincinnati Meeting of the A.V.M.A.

The 84th annual meeting of the American Veterinary Medical Association, which was held in Cincinnati August 18 to 21, 1947 was, all things considered, probably the most successful convention in the Association's history. The attendance, 2200, was a record as was the number of scientific papers and motion pictures presented. The committee reports were numerous and mostly forward looking. Harmony prevailed. It is not polite to describe the weather or the headquarters hotel. The committees on Local Arrangements, with Dr. A. G. Madden, Jr., Madeira, Ohio, general chairman, functioned in an outstanding manner. The work of the entertainment committee under the chairmanship of Dr. J. A. Winkler, Newport, Kentucky, himself a first-class entertainer, and of the committee on Military Activities under the supervision of Colonel Seth C. Dildine are worthy of particular commendation. The efficient planning of the 11 committees on local arrangements contributed much to the comfort and enjoyment of those attending the meeting and were an important factor in the smooth operation of the convention. The meeting had a "good press."

Awards

Three awards for distinguished service were made at the opening session of the meeting.

The Borden Award for veterinary research



William John Butler

"contributing to dairy cattle disease control" —a medal and $1000—went to Dr. Jacob Traum of the University of California.

The 12th International Veterinary Congress Prize was awarded to Dr. William John Butler, State Veterinary Surgeon of Montana, for unique and distinguished service to his state in setting up livestock disease control measures and establishing a state-wide milk and meat inspection service for Montana.

The National Humane Act Award—a citation and $100 U. S. saving bond went to Suzanne Weller, a 14-year-old Pittsburgh school girl, for "extraordinary courage and heroism" in the capture and confinement of a rabid fox terrier that had bitten 31 persons and was creating panic in a public school yard.

JACOB TRAUM

Jacob Traum was graduated from the New York State Veterinary College at Cornell University in 1905 with degrees of D.V.M. and M.S. He was engaged in meat inspection and field work in the Bureau of Animal Industry, USDA, 1905-08, and in the Pathological Division of the Bureau, 1908-14. Since 1914 he has been on the staff of the Division of Veterinary Science, University of California.

Doctor Traum was the first to describe Brucella infection in swine (1914) and was the first to call attention to the so-called skin lesions of tuberculosis (1916) and to demonstrate its importance in causing reactions to tuberculin. In 1925 Doctor Traum was one of a commission of three sent to Europe by the USDA to study foot-and-mouth disease. He spent a year in investigation of the disease in France and Germany. It was this commission that discovered the plurality of viruses of foot-and-mouth disease.

Throughout his long career in California, Doctor Traum has been engaged mainly in veterinary research.

The New Officers

The officers chosen for 1947-48 are:

President elect: Leslie M. Hurt, Sierra Madre, Calif., former chief Los Angeles County Livestock Sanitary Department, former member Executive Board A.V.M.A.

1st vice president: C. C. von Gremp, Decatur, Ga., practitioner.

2nd vice president: A. E. Cameron, Ottawa, former Veterinary Director General of Canada. Recently retired from Executive Board of the A.V.M.A. after serving 15 years.

3rd vice president: C. R. Curtis, Portage, Wis., practitioner.

4th vice president: I. S. McAdory, Auburn,

Ala., Associate State Veterinarian of Alabama.

5th vice president: Ernest H. Willers, Honolulu, H. T., Territorial Veterinarian of Hawaii.

Treasurer: W. A. Young, Chicago, chairman A.V.M.A. Humane Act Award Committee and managing director Anti-Cruelty Society of Chicago.

PRESIDENT-ELECT OF THE A.V.M.A.

Leslie M. Hurt, was graduated from the Iowa State College in 1904 with the degree of D.V.M. After a short period in the B.A.I. he returned to teach physiology in the Iowa school three years, and also received a B.Sc. in agriculture. For the next five years he was Professor of Veterinary Science and Experiment Station Veterinarian at the Michigan State College. In 1912 he accepted the position of City Veterinarian in Pasadena, California, and shortly thereafter was appointed Livestock Inspector for Los Angeles County.

In 1924 Doctor Hurt was authorized to organize the Los Angeles County Livestock Department, an organization that is unique in this country. It has charge in the country of livestock disease control and sanitation, meat inspection, garbage feeding operations, sales and stockyards operations and poultry, rabbit and fur animal investigations. This requires a full time force of 15 veterinarians, office and laboratory personnel, a quarantine officer, a cleaning and disinfecting crew, guards and lay inspectors. This county organization has an official representative on the Executive Committee of the U. S. Livestock Sanitary Association thus being recognized on a par with the various state livestock sanitary commissions and departments. The American Association of Animal Science accords the department similar recognition.

Doctor Hurt has long been active in veterinary association work, having been president of the Southern California and the California State Veterinary Associations. He has continuously held membership on important committees of the U.S.L.S.A. and the A.V.M.A. He served two terms on the Executive Board of the latter association.

Dr. R. H. Hurt, one of Doctor Hurt's four sons, was graduated from the College of Veterinary Medicine, Washington State College in 1938. He has since served on the teaching staff of his alma mater, of the University of Illinois and in the Army. He is at present employed by the Union Stockyards Co. of Los Angeles.

Dr. Wm. A. Hagan, Ithaca, N. Y., Dean, New York State Veterinary College at Cornell University, *president-elect,* was installed president at the final general session of the meeting.

Women's Auxiliary to the A.V.M.A.

The 1947-48 officers elected by the Women's Auxiliary are:

President: Mrs. Ashe Lockhart, Kansas City.

1st vice president: Mrs. Anthony E. Bott, Belleville, Ill.

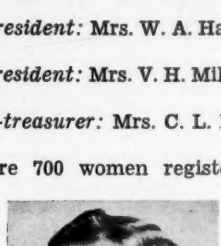
2nd vice president: Mrs. O. B. Curry, Morristown, Ind.

3rd vice president: Mrs. W. A. Hagan, Ithaca, N. Y.

4th vice president: Mrs. V. H. Miller, Charleston, W. Va.

Secretary-treasurer: Mrs. C. L. Miller, River Forest, Ill.

There were 700 women registered at the convention.



PRESIDENT OF THE A.V.M.A.

William Arthur Hagan was born at Fort Scott, Kansas, in 1893, and graduated from the Veterinary Division of Kansas State College in 1915. He taught pathology in the Kansas school in 1915-16 and in the New York State Veterinary College at Cornell University 1916-31, becoming dean of the school in the latter year, which position he still holds. Special positions held include: assistant, Rockefeller Institute for Medical Research 1921-22, European fellow International Education Board 1925-26, special consultant to Chief of the Bureau of Animal Industry, USDA, 1944-45, consultant Division Public Health and Public Welfare, U. S. Group Control Council, Germany 1945-46.

He is author of Laboratory Manual of General and Pathogenic Bacteriology, 1925; Lectures in Pathogenic Bacteriology and Immunity, 1934; The Infectious Diseases of Domestic Animals, 1943, and many articles in scientific periodicals.

Women's Veterinary Association

An organization of women veterinarians was effected having for its objective "promotion of friendship and understanding between women veterinarians of all nations."

President: Lucille S. Dimmerling, East Liverpool, O., general practitioner.

Vice presidents: Patricia O'Connor, veterinarian, Staten Island Zoo, New York; Elinor McGrath, Chicago, small animal practitioner, and Edith Williams, Toronto, small animal practitioner.

Secretary: Lieut. Doreen Hatfield, V.C., Baltimore, Md.

Treasurer: Josephine Brown, Fargo, N. D., assistant manager, Ft. Dodge Laboratories' Dakota depot.

Veterinary Exhibitors' Association

The American Veterinary Exhibitors' Association, which schedules a lunch and business session during annual A.V.M.A. meetings, chose the following officers for 1947-48.

President: Chas. E. Fanslau, Winthrop Chemical Co.

Vice president: C. Guy Stephenson, Goshen Laboratories.

Secretary-Treasurer: Roscoe V. Hill, Fort Dodge Laboratories.

Board of Directors: Elwood A. Garner, R. J. Strasenburg Co.; L. A. Mosher, L. A. Mosher Co.; C. L. Campbell, Lederle Laboratories, and A. H. Quin, Jensen-Salsberry Laboratories, Inc.

The Fact-Finding Committee, composed of J. L. Wells, Haver-Glover Laboratories; Wm. A. Lott, Armour and Co., and C. Guy Stephenson was commissioned to prepare a code of ethics for the members of the Association.

The Exhibitors' Association will continue the effort, begun last year, to lessen the scheduling of state veterinary meetings in the same region on conflicting dates. Association secretaries who wish to avoid scheduling their meetings on conflicting dates are invited to write Mr. Stephenson.

Foot-and-Mouth Disease in Deer

The committee on diseases of wild animals urged a study of "the true relationship between deer and cattle in regard to foot-and-mouth disease." If the present outbreak of the disease in Mexico or if any future outbreak should spread to wild ruminants, veterinarians should be in a position to make well-founded recommendations for handling the situation.

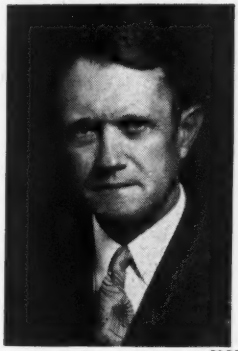
Interference with wild life as a measure for disease control has been unpopular in this country. The Department of the Interior which administers the laws and regulations affecting wild animals on government reservations is chary of permitting wholesale slaughter of wild animals to eradicate diseases of domestic animals, as those engaged in tick eradication have good reason to know. Conservationists and the general public have, on occasion, been even more opposed to such measures.

When in the outbreak in California in 1924 the disease spread to the deer in the Petaluma National Forest, and the authorities proposed handling the deer as exposed cattle were handled, a great public outcry was raised against killing the deer. In time the objections of sentimentalists became lulled only to break out more fiercely than ever before when shooting and trapping the deer proved inadequate and resort was had to poisoning.

Killing all the deer, antelope, wild hogs, etc., in any considerable area is usually exceedingly difficult and fortunately not often required to control disease in domestic ruminants. The history of foot-and-mouth disease is that it will not long maintain itself among deer; possibly because of lack of intercourse and mingling between separate small herds. In the outbreak in 1924 there was so much commingling of cattle and deer that it was thought likely that if the disease was uncontrolled in deer the two species would reinfect one another indefinitely.

Actually not all the deer in the Petaluma National Forest were killed. When the project was under consideration the Department of the Interior was asked the number of deer in the Forest. Using a slide rule for computation for a few minutes, the Department answered 7973, or some such definite number, around 8000. When the killing was discontinued approximately 22,000 carcasses had been counted and as poisoning was extensively employed there may have been others that were not found. When no carcasses showing active or recent lesions of foot-and-mouth disease had been found for several months, the destruction of the deer was discontinued and it was judged the disease no longer existed on the range. Subsequent experience confirmed this conclusion.

President at the Cincinnati Meeting



USDA Photograph

BENNETT T. SIMMS

Chief of the Bureau of Animal Industry, USDA, has the distinction, because no meeting of the A.V.M.A. was held in 1945, of having been president-elect for two years and president one year. He was graduated from the School of Veterinary Medicine, Alabama Polytechnic Institute in 1911. He was head of the Veterinary Department of the Oregon Agricultural College for 25 years and of the USDA Regional Animal Disease Research Laboratory from 1938 until his appointment to be Chief of the Bureau in 1945, the same year in which he was chosen president-elect of the A.V.M.A.

National Veterinary Examining Board

A national board of veterinary examiners, designed to further elevate the standards of veterinary education and practice, was advocated by a special committee headed by Dr. Walter R. Krill, Dean of the College of Veterinary Medicine, Ohio State University, who recommended that final action on the proposal be deferred until the meeting next year.

Establishment of such a board would help to make veterinary service available with greater speed, whenever and wherever it may be needed, the committee indicated.

The national board of veterinary examiners would be entirely unofficial. License to practice a profession or trade being a police function and reserved to the states, a national board could not, of course, grant licenses to practice in any state. It is thought, however, that the licensing authority in some states might accept the passing of an examination given by the national examining board as sufficient evidence of competence and, in the course of years, a majority of states—possibly all of them—might accept such evidence in lieu of examination given by the state. To do this, the veterinary practice acts of many states would have to be amended.

Army Veterinary Legislation

As all must know by this time the legislative committee took a beating in the passage of the Army Personnel Bill at the recent session of the Congress. Heretofore medical, dental and veterinary graduates were initially commissioned in the Army in the grade of first lieutenant with four years to serve in that grade before being promoted to the grade of captain.

Under the new promotion law the initial commissions of medical officers will be in the grade of first lieutenant with three years to serve before becoming eligible for promotion; dental officers as first lieutenant with four years to serve in that grade but veterinary commissions are set back to second lieutenant in which grade newly commissioned officers must serve one year. Among other disadvantages this amounts to a reduction in salary as, throughout his military career the veterinary officer will be later in reaching the higher grades and higher pay than other officers in the Medical Department of the Army.

This action on the part of the Congress derived from the fact that medical and dental schools require two years of college work for matriculation whereas veterinary schools require but one year. The extra year time credit allowed medical officers is based upon the year of internships required of medical graduates. This is a bad break for the Army Veterinary Corps, but it was not unforeseen and would have happened earlier but for the war.

The committee on legislation in its report urged the A.V.M.A. Council on Education and the Association of American Veterinary Deans to make a joint study of the "feasibility and desirability" of raising the minimum educational requirement for matriculation for a veterinary course to two years. At least three of the colleges already have this requirement.

A further inequality is the provision in the legislation for the payment of an extra $100 per month, in addition to the regular salary for the grade, to all medical and dental officers. Veterinary officers are not eligible for this extra compensation. Further medical and dental officers may be commissioned in the Regular Army from civil life in any grade up to and including colonel. This opportunity is not open to veterinarians.

Worthless "Remedies"

A new attack on the problem of so-called "livestock remedies" which have "slight or uncertain value" was proposed by the committee on therapeutic agents and appliances. With sufficient funds and authority, the committee believes it could do much to discourage the "compounding and sale" of preparations with little therapeutic value.

The committee proposes to draft a set of official rules to be followed in determining whether a new remedy has value in the treatment of animal diseases.

Under the committee's plan, "approval of a therapeutic agent would not be an indorsement but would mean that it conforms to the rules."

The committee on public relations also referred to this matter when it stated that buying and administering animal remedies without the benefit of an accurate diagnosis of the ailment being treated is a "dangerous and unsound practice" and "should and could be corrected."

The A.V.M.A. now has approximately 10,000 members. Its income last year exceeded $150,000. For the first time in many years expenditures exceeded income, principally because of the increased cost of paper and printing for the Association's publications. An amendment to the by-laws to increase the annual dues from $7.00 to $10.00 was proposed and favorably received.

The dog food testing program gave its last gasp. The Association is indeed fortunate to be rid of it without a scandal.

Next year the meeting will be held in San Francisco.

If space can be made available highlights of the scientific program will be reviewed next month.

The Treatment of Equine Influenza

A. C. ROGERS, D.V.M.*
Smithfield, Virginia

EQUINE influenza is a major problem of both clinical veterinary medicine and agricultural economics. The 1942 Yearbook of the USDA describes this condition as "probably the most contagious and widespread disease to which horses and mules are susceptible," the death rate running "as high as 10% of the cases." This Yearbook also emphasizes that the economic loss from equine influenza deaths "is in the aggregate serious."

Both the clinical problem of equine influenza and its economic aspects were forcefully brought home to the veterinary staff of the Terminal Stockyard Company by the large-scale UNRRA livestock collecting and shipping program. We are certain that the same applies to the some 100 UNRRA veterinarians who worked with us for short periods while waiting to ship out with animals being exported.

For many months we had at all times in the Company's yard or on its farm several thousand UNRRA horses, mules, and jacks which were awaiting shipment to Europe. These animals had been collected over large areas and often had been shipped long distances to Newport News. It soon became apparent that approximately one-third of the animals in a shipment would require medical attention immediately upon arrival at our yards. It was equally apparent that any measures which would significantly reduce the prevailing shipping fever mortality would save the shippers and UNRRA thousands of dollars weekly. We set about to do this. And we were able to reduce the mortality to about 2% of the shipping fever cases which developed in the approximately 150,000 horses, mules, jacks, and cows that we handled.

Our cases of equine influenza, usually complicated by secondary invaders, were chiefly caused by three things:

1. *Lack of immunity to the disease.*—The majority of the animals shipped to us had been taken directly off the farm. Few of them had been exposed previously to equine influenza. Consequently, they were without immunity to the disease when they were suddenly brought into intimate contact with a large number of other animals at the initial collection points.

2. *The incubation period of equine influenza.*—Because of this, pre-clinical cases of shipping fever could not be recognized before the animals left the first collection points, or until they were at sea.

3. *Conditions of shipping.*—At the first collection centers the animals were loaded, closely packed and nose-to-nose, in open-slot box cars. Their trip by rail often took several days, during which time they were fed, watered and rested only at 36-hour intervals. While en route these animals were often exposed to low temperatures, biting winds, cold rains, snow and sleet. It is not surprising that on arrival at Newport News as many as one-third of these animals already had influenza and required immediate medical attention. (I agree with the veterinarian who said that if we went through the same ordeals when we travel, we would, at the end of our journeys, present much the same symptoms to our physicians.)

On arrival at our stockyards these unfortunate animals that had stood in a swaying, crowded car unable to eat, drink or rest for 36 hours at a time, many exposed to inclement weather and all exposed to virulent infection, were showing temperatures in the 103° to 106° F. range, extreme weakness and depression, rapid breathing, cough; watery discharge from the nose and eyes, yellowish-pink conjunctiva, often edema of the head, abdomen, and legs; head hanging, as from weakness; eager but sparing desire for water; and sometimes restlessness, the joints making cracking sounds as the weight was shifted. Usually, these animals presented alarming additional symptoms due to shipment, internal parasites and secondary invaders, diarrhea, rapid and labored breathing with pulmonary rales, and the rapid pulse of threatening, or actual, circulatory failure.

Our clinical problem, then, was: Having diagnosed equine influenza, usually with complications, what should we do about it? Many of these animals were seriously ill and becoming weaker rapidly. Toxins were depressing their breathing and their blood pressure and diarrhea may have added to the poor state of the circulation. They required immediate and adequate attention or they would die.

The procedure which enabled us to handle large numbers of cases of equine influenza successfully is:

1. Affected animals arriving at the stockyards were segregated in the hospital area.

2. Pens in the hospital area were set aside for animals in different stages of shipping fever and for those with other ailments and

*Veterinarian in charge, Terminal Stockyard Co., Newport News, Va. Now practicing in Smithfield, Virginia.

injuries due to shipping. One pen was reserved for animals that would serve as blood donors. Each of these pens was equipped with a chute especially designed for easy handling and treatment of these animals.

3. Each animal with shipping fever was given a metal tag bearing its identification number, and a record card, which also bore this number, was made out. This card shows the diagnosis and general description of the case, including temperature and the prognosis. To the card was added the treatment to be given,

Approximately one-third of the animals in a shipment required medical attention immediately upon arrival at the yards

the details of the progress of the case, and the final outcome of recovery or death.

Treatment

Before outlining the treatment which gave us our lowest equine influenza mortality, I may mention that our best therapy did not include hemorrhagic septicemia serum, neoarsphenamine nor sodium cacodylate (except that the arsenical compounds were employed as tonics during convalescense), penicillin, nor streptomycin. When we stopped vaccinating every horse, especially in the summer, when heat stroke was a vital factor, our losses went down (this statement does not apply in the case of bovine shipping fever, where hemorrhagic septicemia serum and bacterin are necessary for prevention and treatment of the disease). We also observed that non-vaccinated animals regained strength faster than the vaccinated because they rested instead of being excited again by mass handling and were able to take greater advantage of the excellent feeding program of the yard. The arsenicals did not seem to reduce the temperature nor effect any improvement other than possibly as tonics. Similarly, penicillin was used in several hundred cases of equine influenza without noteworthy results. No appreciable change in the temperature was obtained from even massive doses of penicillin given every three hours over a 24-hour period or from regular or greatly increased doses combined with beeswax and given three times daily. The vials of streptomycin at my disposal were used on several animals. Doses of various sizes were tried, but produced no changes in the symptoms. Possibly larger doses might have given better results.

Our best therapy consisted of a stimulant drug and a sulfa drug, as well as drugs for diarrhea, strangles, and purpura hemorrhagica. It also included intravenous saline or glucose solutions or transfusion of whole blood and a gradual process of worming with phenothiazine when the animal was strong enough to endure anthelmintic medication.

The stimulant usually was the first drug given; because the respiration and blood pressure were obviously being depressed by toxins. If a desperately sick animal is to live until the infection can be controlled by drugs and its own physiologic defense mechanism, respiratory-circulatory failure must be prevented. We have tried about all of the central nervous system stimulant drugs, including amphetamine and metrazol. Amphetamine has proved satisfactory in some cases. However, some animals are overly excited by it, and only one dose in a 24-hour period should be given. These are disadvantages, because restlessness should be avoided as much as possible. We prefer metrazol to amphetamine. Our opinion of metrazol as a stimulant is pretty well summed up by Pickrell and Richards[1] in their statement: "Metrazol exerts a prolonged and intense action on the vasomotor and respiratory centers in the medulla. The effect on the medullary centers is much more prominent when their functions are in a state of depression. When the circulation has been depressed by a hypnotic agent, metrazol causes a marked rise in blood pressure. It is relatively non-toxic in so far as the amount necessary to produce therapeutic action is concerned. Its action is practically instantaneous when the drug is injected intravenously." Also we found metrazol does not excite the animal, and it can be given as often as may be necessary.

Animals in an extremely weakened condition from the effects of shipping fever, must be fed and handled carefully. Unless care is exercised to prevent exertion or excitement, they often suddenly collapse and die. To prevent or to overcome respiratory-circulatory failure, collapse, and death, we injected an initial intravenous dose of 30cc of metrazol. As soon as the animal was sufficiently stimulated to stand handling, we start our sulfonamide therapy. Then several hours later

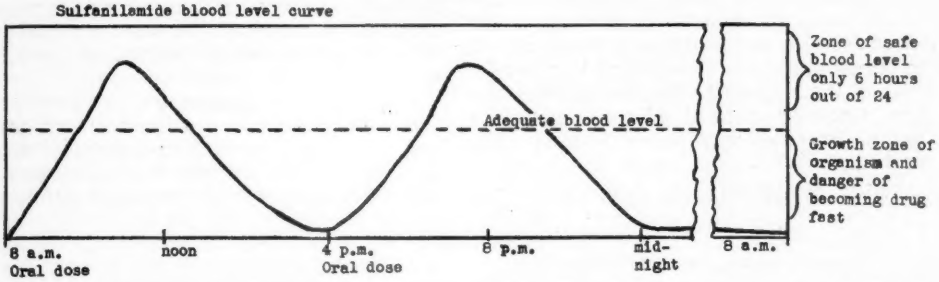
[1] Pickrell, Kenneth L. and Richards, Richard K.: Pentothal-metrazol antagonism, a method of shortening the recovery period following pentothal anesthesia. *Annals of Surgery*, 121:4 (April), 1945.

we give the second dose of metrazol, usually 20cc, which sustains the effect of the first metrazol injection.

The size of, and the intervals between, any subsequent doses of metrazol are gauged by the animal's need for support. We believe in giving the drug as early as possible in doses large enough and repeating it as necessary to support the animal until the infection is brought under control. Sulfonamide therapy was continued for three or four days.

Sulfa drug therapy will show some signs of improvement in 24 to 36 hours or it will not help at all. If the animal does not respond with a drop in temperature and clearing up of the conjunctiva within this time, additional treatment is started. At first, we gave sulfanilamide, 1 to 1.5 grains per pound of body weight (divided into two doses) daily for three or four days. When sulfanilamide alone was used, the sulfanilamide blood level curve would be very irregular (Fig. 1).

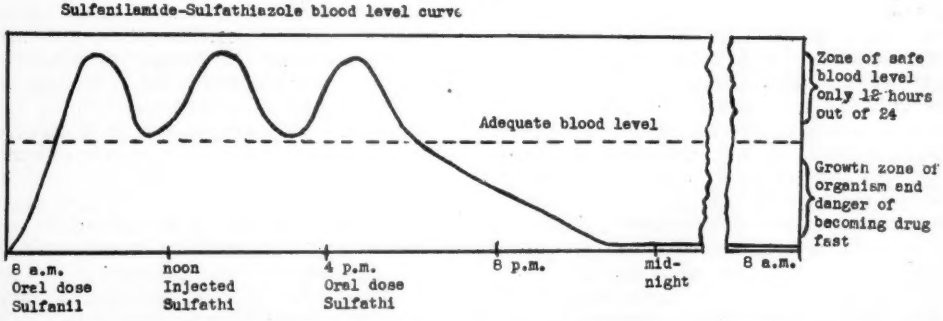
Figure 1



Of the animals given sulfanilamide alone, there was always a percentage whose temperature either remained elevated or undulated daily. This could be helped somewhat by an intravenous injection of sodium sulfathiazole one grain per pound of body weight, given between the two doses of sulfanilamide. When sulfathiazole was injected between the two doses of sulfanilamide, the blood level curve indicated a better, but still not long enough maintained, blood concentration. The curve resembled that shown in Fig. 2.

We now use the sulfamethazine in preference to the other sulfonamides. The experimental work we did with sulfamethazine indicated that no other sulfonamide can compare with it in therapeutic value in equine influenza. We consider the results we obtained from sulfamethazine to be outstanding. With this drug we were able to maintain an excellent blood level over a 24-hour period with a single small dose daily. The best results are obtained by injecting intravenously one grain of sodium sulfamethazine per pound of body weight and, at the same time, giving a single oral dose of 1.5 grains per pound of body weight, on the first day. On the second and third days, a single oral dose of 0.5 grain per pound is given. These small doses invariably maintained a good blood concentration of the drug throughout the 24 hours, and the animals responded beautifully (Fig. 3).

Figure 2



Many animals arrived at the yards with a bad case of scours caused by faulty handling en route or by infections which were part of the influenza complex, or by both of these factors. As would be expected, they were in an extremely weakened condition. In these

cases, immediate supportive stimulant treatment is imperative, and here, again, metrazol was used with good results. The diarrhea was usually controlled by giving this prescription:

℞

Pearson's creolin .....5 ii
Krameria astringent .....5 iv to vi
Mineral oil q. s. .....½ gallon

Sig.: Give in one dose via stomach tube directly into the stomach.

Following this medication, the animal was kept off water for from 18 to 24 hours, but it was allowed all the good hay it would eat. If the temperature was elevated, as was usually the case, the sulfamethazine therapy was also given. One dose of the oil mixture was usually enough, but feed and water was carefully watched.

Another complication of shipping fever is strangles, but here we usually have a less severe disease with which to contend. The sulfonamides and the iodides give excellent results in most cases. However, at times the parotid and submaxillary lymph glands were so enlarged and dense that both breathing and swallowing were difficult. A tracheotomy was needed to permit adequate intake of air, and the animal fed by a stomach tube until the enlargements softened and could be lanced to relieve the pressure obstruction. Here, again, a stimulant was advisable for supportive treatment. Occasionally we lost such horses because abscesses ruptured into the trachea and caused gangrenous pneumonia. On necropsy of these animals, in addition to the gangrenous condition of the lungs, we found large abscesses in the lymph glands in other parts of the body.

Purpura hemorrhagica associated with equine influenza was treated by a daily subcutaneous injection of 10cc of adrenalin solution, 1:1000. This medication at times gave spectacular results, especially when the head was so swollen that the horse could not eat, and in some cases could scarcely breathe. Adrenalin reduced the swelling within 24 hours, and the petechiae in the nostrils disappeared as the swelling went down. When the legs were badly swollen the condition cleared up somewhat more slowly. We have also used blood transfusions, iodides and formalin, but with only an occasional recovery.

Considerable credit for the success of the shipping program is due to the many UNRRA veterinarians who voluntarily and wholeheartedly cooperated with us and rendered excellent and appreciated service while they were in Newport News awaiting departure of their boats for overseas.

Summary

Equine influenza is a major economic problem of clinical veterinary medicine. When seen by the veterinarian, it is often complicated by superimposed secondary infections. And the situation is sometimes made worse by internal parasites, scours, strangles, and purpura hemorrhagica. The USDA gives up to 10% as the equine influenza mortality. The death rate was reduced to about 2% when we adopted the following procedure:

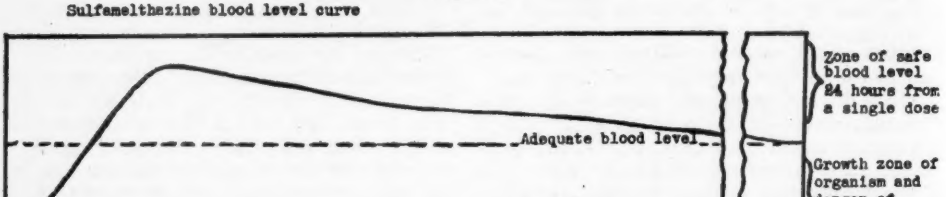
1. Immediate segregation and isolation of animals with shipping fever upon their arrival at the Newport News Stockyards.

2. Injection of metrazol, when the animal was seriously ill and in a state of collapse. Continued support to the animal until other measures controlled the infection.

3. Daily doses of sulfamethazine to combat the infection and resultant toxemia.

4. Treatment of complicating conditions: Scours, by giving a creolin-astringent-mineral oil preparation; strangles, by administering sulfonamide and iodides, and by performing any necessary surgery; purpura hemorrhagica, by giving adrenalin; and internal parasites, by giving five- or six-gram doses of phenothiazine repeated for four to five days, when the animal was well enough to stand anthelmintic treatment.

Figure 3


Sulfamelthazine blood level curve
Zone of safe blood level 24 hours from a single dose
Adequate blood level
Growth zone of organism and danger of becoming drug fast
8 a.m. Oral & Injected doses
noon
4 p.m.
8 p.m.
mid-night
8 a.m.

Collection of Semen by Means of the Urethral Fistula*

By L. E. A. ROWSON, M.R.C.V.S.
Bromsgrove, England

WITH the rapid development of artificial insemination in Britain during the last few years a number of technical difficulties naturally have been encountered. Some of these have been easily overcome, but a condition or group of conditions is often met in the bull involving a derangement of the neuromuscular mechanism of the sex act. The symptoms of these conditions are that the bull becomes slower at service, often rests his head on the cow's hindquarters, and becomes very sleepy with no attempt at coition.

Some of the causes of inhibition of copulation are well known and involve various associations with the act. Most of these associations are either painful, or at least distracting. An example is the use of the artificial vagina at a temperature too high or too low, or holding it at an incorrect angle, so that pain is inflicted as service takes place. These associations are built up over a period and are always connected with the act of serving, until the bull eventually refuses to serve at all. Such a bull is often difficult and sometimes impossible to cure with the result that he is useless for artificial insemination purposes.

Fortunately there appears to be no such inhibition when the animal is turned loose with females, and a bull showing these symptoms and refusing to serve into the artificial vagina has been known to serve naturally 27 times in 24 hours. The problem, therefore, arises as to how such animals, if they fail to respond to the various forms of treatment, can be brought into useful service again.

It is a well-known fact that certain natives make an incision into the urethra of the stallion, and then use him as a teaser, the sperm escaping via the fistula, and it was decided to try a similar method in the bull. If this worked satisfactorily the inhibited animal could be allowed to serve a cow and a method devised for collecting the semen issuing from the fistula. A cannula was therefore designed which could be introduced into the urethra of the bull. A number of points had to be considered in the design of the tube:

1. It had to be *in situ* under all conditions.
2. It had to be designed so that when not in use for collecting semen, urine could be passed normally, since it is undesirable to have the hind legs continually wet.
3. It was assumed that, as in the case of the native stallions, the semen would take the line of least resistance, and pass out via the fistula instead of via the penis, but a plug was available for introduction should this prove not to be the case.

A cannula shaped like a letter "J" was finally decided upon (Fig. 1) with a replaceable screw plug fitted at the external opening "B." The end of the bent arm was given a rounded and raised lip to help maintain the

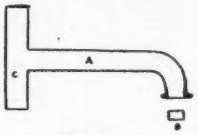


Figure 1

rubber connection in place. When not in use plug "B" can be screwed into position so that the bull can urinate normally through the straight tube "C" (Fig. 1) and penis.

The cannula was made of brass and plated with nickel, but at the necropsy it was found to be badly corroded. A stainless steel or tantalum tube would be far more satisfactory. The

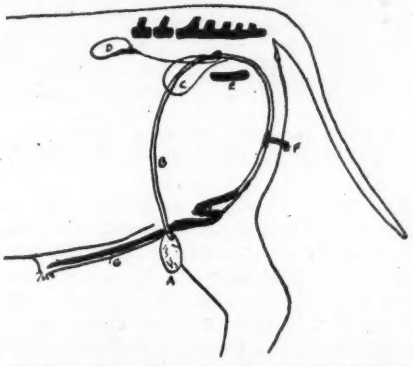


Fig. 2—A, testicle; B, vas deferens; C, bladder; D, kidney; E, pubis; F, cannula; G, penis

site chosen for the introduction of the cannula was a point about eight inches below the anus and behind the sigmoid flexure (Fig. 2). It was thought that this was the point least likely to get fouled with feces or to be lain upon when the animal was at rest.

*From *Vet. Rec.* 59:22, pp. 289-291. (June 14) 1947.

The operation was performed under chloroform and an incision made directly down on to the urethra. At this point it is surprisingly deep—at least 1½ inches below the skin surface. A small incision was made into the urethra itself, and at this point there was

Fig. 3—Shows curved arm of cannula issuing from skin. The two marks above are old suture scars

Fig. 4—Showing collecting tube in position after collection has been taken

considerable bleeding which greatly hampered the operation. It was assumed that the point of the scalpel had penetrated through the urethra and into the erectile tissues beyond. It would probably simplify the operation greatly if a bougie or sound could be passed up the urethra to define it and give the operator something on to which to cut down.

Having made the urethral incision the straight arm of the cannula was slipped into the opening which was then stretched by using the handle of the scalpel as a lever, the fulcrum being the other end of the tube. The cannula will suddenly jump into position and the stretched urethra jerk back into its normal position. The urethral incision was not sutured and the wound was closed by one or two deep gut sutures followed by interrupted skin sutures. It is a mistake not to suture the urethra, since urine tends to escape alongside the cannula and delay healing, and some pocketing may occur. It was noticed that in spite of the fact that the plug at "B" (Fig. 1) was left out, no urine was escaping *via* the cannula. It was thought that either it must have slipped out of the urethra or be blocked, and consequently the animal had to be cast again, and the tube removed. It was found that the cannula was completely blocked by clots which had become hardened. After clearing, the tube was replaced and the wound was restitched. Healing was much slower this time, but urine was passed via the cannula, only a small amount issuing from the penis. The plug at "B" (Fig. 1) was now screwed into position so that the animal urinated normally and the wound was left to heal. It was decided to use the artificial vagina when taking semen

samples from the animal so that a check could be made on how much semen issued *via* the penis and how much *via* the fistula. To obtain the fistula collection a glass tube was connected to the cannula by means of a short length of rubber tubing in which a small vent had been made to allow excess air to escape (Figs. 3 and 4).

The bull was led out to the cow and allowed to serve into the artificial vagina. The first two collections so obtained gave a fistula volume of 6.0cc and 6.1cc, while only 0.3cc was obtained in the vagina in each case. The quality of the semen was excellent, but both samples were blood-stained. This was not unexpected in view of the fact that the cannula had to be removed and replaced in a second operation.

Repeated collections were made over a period of some weeks, the volume of semen varying between 2cc and 6.5cc *via* the cannula while in no case, after the first two collections, was any semen at all obtained *via* the artificial vagina. Almost all the fistula samples, however, showed some blood cells, the number varying greatly with each collection. The quality of the semen samples continued to be excellent and after collection the plug at "B" (Fig. 1) was replaced so that urine was passed normally. One of the disadvantages of the "J" tube is the dead space in the curved arm when the plug "B" is in place. This fills up with urine, and may be a source of infection. A slightly different tube has now been designed to overcome this, the seal being at the urethral end of the extension arm.

The animal was slaughtered four months after the introduction of the cannula and a post-mortem examination conducted. There was no sign of infection anywhere throughout the urogenital tract and where the cannula had been in contact with the urethra the walls appeared perfectly healthy. The reason for the presence of blood cells in samples was at once obvious. Failure to suture the urethra above and below the curved arm had resulted in pocketing so that when the usual precopulatory contractions took place the ends of the cannula chafed the edges of the pocket thus causing slight bleeding. Had the urethra been sutured it seems highly probable that no bleeding at all would have occurred during collection. There was also a very slight degree of "furring" on the inside of the cannula. This was of a cellular nature and was easily removed and probably was due to chafing.

Although immediate results obtained by this method appear promising there are many factors to be taken into consideration. These include:

1. The degree of bacterial contamination occurring in samples obtained in this way.
2. The possibility of the animal developing an ascending infection and cystitis.
3. Granulations may occur in the urethra due to irritation set up by the ends of the cannula.
4. The possible results which may follow removal of the tube if the animal returned to natural service, especially stricture.

(It should be pointed out, however, that if the plug at "B" (Fig. 1) is in place, the bull can serve naturally without removal of the tube and it could be left in position indefinitely.)

5. The difficulty of keeping the inside of the cannula clean and reasonably bacteria free.

To clarify all these points will take a considerable time.

In conclusion, it appears that a method of collecting semen is available which will overcome the difficulties encountered with some bulls when using the artificial vagina, but that this method is as yet too experimental for general use. The use of a similar type of tube in the stallion would appear to have great possibilities. The stallion is frequently very difficult to collect from and his use for artificial insemination may be difficult, but with this method he could serve a mare normally and a method be devised for catching the large bulk of semen issuing from the cannula. A larger bore cannula would be necessary to prevent blockage by the gelatinous accessory secretions and to allow for the greater volume of semen.

Successful Veterinary Authors

The Orange Judd Publishing Company's fall catalog of new books contains the announcement of seven books by veterinarians. Management and Feeding of Sheep, by E. T. Baker, How to Breed Dogs and Blood Hounds and How to Train Them, both by Leon F. Whitney, Some Common Diseases of the Horse and Some Common Diseases of Cattle, both by George H. Conn, and Poultry Sanitation and Disease Control by R. C. Surface, Director, Veterinary Department, White Laboratories. Both Baker and Whitney are frequent contributors to this magazine. They are also experienced and successful writers of books. Doctor Baker's Sheep Diseases, published in 1916 attained a distribution in excess of 7,500 which is large for a strictly professional veterinary work; more than 30,000 copies of his Home Veterinarian, published four years ago have already been sold. Both of Doctor Whitney's books have gone through several reprint and revised editions. The one on breeding has been the standard authority on canine genetics since its first appearance more than a decade ago.

Regulations for Artificial Insemination

By JACOB LAWRENCE
Elmhurst, L. I., New York

DURING the last few years, artificial insemination has become such a practice among breeders of purebred livestock, especially the dairy cattle, that specific regulations had to be incorporated into the constitutions of the various breed associations. This was necessitated both for their own protection and for the maintenance of the standards for their respective breeds. The absence of such provisions leads to fraud or deprives the members of this great opportunity to improve their livestock.

With each association independently formulating its code, many variations and inconsistencies have arisen, so that today, what would constitute a *bona fide* procedure for the registration of offspring obtained by artificial insemination in one breed, would make progeny ineligible for registration in another breed. The object of this article is to summarize the procedures required by the different associations.

Dairy Cattle

The Guernsey, Jersey, Ayrshire, Holstein-Friesian and Brown Swiss Associations all abide by the regulations set forth by the Purebred Dairy Cattle Association. This organization divides artificial insemination into three categories. (1) That performed within the same herd, in which case no special application blanks are necessary; (2) artificial insemination practiced between herds; a combination collection and insemination certificate must be filled out. The information on collection is supplied by the owner of the bull, and the certificate is then sent with the semen to the owner of the herd to be inseminated. The owner of the cow completes the certificate at the time of insemination and it is sent to the breed association with the application for registry or birth report. A footnote on the collection-insemination certificate warns that it must be forwarded within seven days after the cow is inseminated, but this practice has been discontinued, so that now it is sent in at the time of registration.

The third category of insemination deals with an Approved Cooperative Artificial Breeding Association, which is one that is approved and supervised by the State College of Agriculture in the state in which the organization is located. If insemination is performed by one of these associations, reports are filled out in triplicate, white, yellow and red. The white sheet (original) is given to the owner of the cow at the time of insemination, and is sent to the breed association at the time of birth.

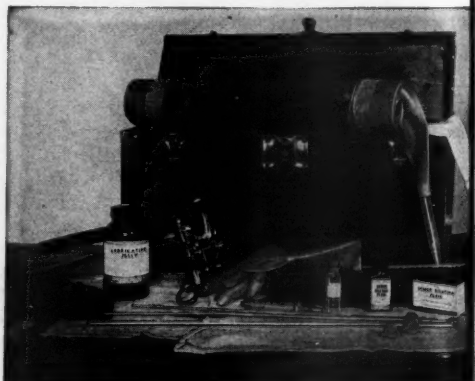
Beef Cattle

The Shorthorn, including the Milk Shorthorn and the Polled Shorthorn, require a certificate that contains essentially all the information asked for by the dairy associations. However, one certificate is required for each insemination, and it must be sent to the association within 10 days of insemination. The Brahma (Zebu) and Hereford breeds have no regulations, while Aberdeen-Angus breeders do not register an animal obtained by artificial insemination.

Sheep

Hampshires require a collection and insemination certificate sent in within 30 days of insemination. The form also has a place for a signature approving technic from the Animal Husbandry Department of the State Agricultural Experiment Station.

Cotswolds, Corriedales, Shropshires, Kara-



INSEMINATION EQUIPMENT FOR COWS
Included are: artificial vagina, vaginal speculum, glass insemination tube, all-glass syringe, chemical thermometer, semen vials, finger cots, semen diluting fluid, thermos bottle, lubrication jelly, obstetrical sleeve, rubber gloves and carrying case.—*Courtesy Jensen Salsbery Laboratories*

kuls, Dorsets and Romneys have no regulations as yet. Although the Suffolk breeders have no written regulations, they propose that insemination be provided by the owner of the ewe receiving a breeding certificate at the time of breeding. The Southdown breeders desire a statement made by a veterinarian or technician collecting the semen and signed by the owner of the ram. They also want a statement signed by the inseminator or the owner of the ewe, but they too have no written regulations. A Columbia lamb will be registered if a certificate is presented having the signature of the ram's owner indicating that semen from his ram was used in artificial insemination.

Goats

All breeds of goats belonging to the American Goat Society or the American Milk Goat Record Association can register the progeny resulting from artificial insemination. A separate service memo should be presented for each doe signed by the owner of the buck, the owner of the doe and the operator. In addition, a written report is submitted by the person doing the inseminating bearing the date and the name and number of the does bred. No regulation exists for Angora breeders.

Horses

Foals obtained through artificial insemination in the Palomino, Arabian or Morgan breeds will not be registered by these associations. Belgian Draft Horses can be registered only if the stallion and the mare are both on the same farm at the same time insemination takes place. The American Saddle Horse Breeders' Association have a regulation which will permit registration only if insemination is performed in the presence or on the premises of the recorded owner of the stallion or authorized agent.

Swine

Very little artificial insemination is practiced by swine breeders, and no regulations have been formulated as yet among the six most popular breeds.

Dogs

Recent word from the American Kennel Club indicates that they will accept for registration litters obtained by artificial insemination provided that (1) The recorded owner of the bitch or his representative witnesses the collection of the semen and the insemination of the female. (2) The signature of the owner of the sire is obtained. (3) An affidavit from the veterinarian in charge to the Club.

No satisfactory procedure has been found for practical application of artificial insemination among fur bearing animals. All work in these species to date has been of an experimental nature.

Much can be done for the improvement of our livestock through artificial insemination, by adopting uniform regulations for all breeds. It is hoped that more interassociation agreement will occur in the future to the advantage of all, as has been amply demonstrated by the experience of the dairy cattle associations.

(name and address of breed association)

CERTIFICATE OF COLLECTION OF SEMEN

This is to certify that _____ took semen from the bull _____ Herd-Book No. _____ owned by _____ on _____ (date)

The semen was placed in a container which was sealed and labeled as follows: _____

_____

and shipped or delivered to _____ (name and address)

Signed _____ (by owner of bull or in owner's name by authorized agent)

Address _____

CERTIFICATE OF ARTIFICIAL INSEMINATION

This is to certify that _____ inseminated the cow _____ Herd-Book No. _____ owned by _____ on _____ (date)

with semen from container marked as follows: _____

and certified to be from sire (name and no.) _____

Signed _____ (by owner of cow or in owner's name by authorized agent)

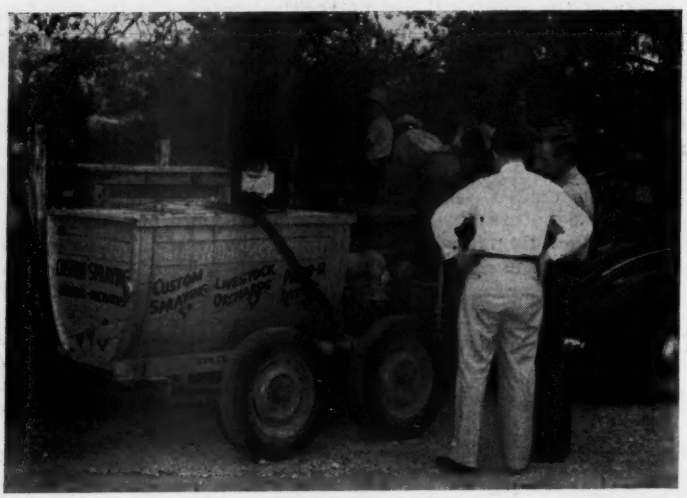
Address _____

Signature of witness of insemination _____

IMPORTANT—This form must be forwarded to the breed association office within 7 days after the cow is inseminated if the resulting calf is to be registered. (This form is not required where the owner of the bull is also the owner of the inseminated cow, but is required wherever the owner of the bull is not the recorded owner of the cow.)

DDT Spray Outmodes Dipping Vat

By R. D. RADELEFF
Kerrville, Texas



The accompanying illustrations record a revolution in the control of external parasites of domestic animals. The principal factor precipitating this revolution is the popularity, efficiency and ease of application of DDT and similar insecticidal preparations. The time-honored dipping vat is rapidly losing popularity to portable, powered spraying units, capable of being moved at high speed over highways and at low speed over almost any type of pasture. In the range areas this mobility is an important factor, enabling the animals to be treated in the home pastures instead of being driven many miles to an available dipping vat.

The rapidity of application and the minimum of disturbance to the animals being treated is in fine contrast to the sweat, vituperative admonitions to unwilling animals, beating and bruising incident to dipping. Almost eliminated are the dangers of irritated animals hooking one another or piling upon one another. The consequent freedom from wounds and scratches followed by the inevitable invasion of the screwworm larvae is a major consideration.

Gone also are the losses due to dips that were too strong, failure of control because of too weak a dip, losses by drowning in the vat, or from ingestion

After the addresses a demonstration spraying of 42 cattle before the seated audience was given. These animals were treated in a total time of 15 minutes. Spraying pens, buildings and hogs followed.

The machine illustrated is an F. E. Myers machine of 200 gallon capacity with constant agitation, mounted on a four-wheel trailer. It operates two hoses and guns at 500 pounds nozzle pressure; delivering about 10 to 15 gallons a minute.

of solutions during the trip through the vat. Instead, we have animals only slightly stirred up, protected against horn flies and lice for at least three weeks and, in addition, some control of ticks and screwworms.

These photographs were made at a public demonstration of dipping and spraying with DDT emulsions at Kerrville, Texas, by the Humble Oil and Refining Company for the particular benefit of its Cuban and Argentinian representatives then in the United States. The dipping and spraying were done with a 0.2% emulsion of DDT. Spraying was done by the firm of Holdsworth and Radeleff.

Both dipping and spraying were done during the morning at the Henke Butcher Pens. Following this work all present enjoyed abarbecue lunch in the auction ring of the farms of the Kerr County Livestock Shows. After the meal the guests remained seated to hear a discussion of modern insecticidal applications by Dr. E. W. Laake of the Bureau of Entomology and Plant Quarantine, Division of Insects Affecting Man and Animals, USDA. Drs. Gaines Eddy and R. C. Bushland of the B.E.P.Q., two of the men most responsible for development of DDT in the U.S., were also present.

Approximately two quarts of the diluted material is required to treat a horse or a cow or a sheep or goat in full fleece. Goats and sheep, recently shorn, and average hogs require about one quart. At current custom work prices, 15 cents is charged per cow and five cents per shorn goat or sheep and hog.

Control of horn flies, lice and sheep ticks is obtained with DDT, while for other ticks we use an emulsion containing 0.1% gamma isomer of benzene hexachloride.

None of those who participated in forcing the cattle into the dipping vat and who watched the spraying, needs any sales talk to "sell" him on the superiority of spraying.

The tremendous labor-saving resulting from the method and the efficiency of our new insecticides means dollars in the ranchman's pocket and more food and clothing for all.

Use of Sodium Sulfamerazine in Foot Infections in Cattle

By J. L. McAULIFF
and W. V. PHILLIPS
Cortland, New York

THE most frequent cause of lameness in cattle as encountered in our practice is due to infectious or necrotic pododermatitis (fouls, foot rot, or foul claw). The degree of lameness varies from a slight stiffness in the affected leg to a condition where the limb is swollen from the foot to the carpal or the hock joint. In most cases there is a marked swelling between the claws and just above the coronary band. The skin immediately above the foot may be greatly inflamed or discolored. Necrotic areas are common. The condition is frequently so severe and painful that the animal is unable, or refuses, to bear much weight on the affected leg. It may also show systemic symptoms, such as anorexia, dehydration. In many cases with prolonged infection, rapid loss of body weight and, in most instances, a reduction in the flow of milk occurs. The effect on milk production is very important to the dairy farmer since, in many cases, the infection causes a significant economic loss. The affected feet present varying degrees and areas of infection. The cause of the infection is believed to be due to *Actinomyces necrophorus;* however, other bacterial organisms may be present. We believe that the primary predisposing factors contributing to the infection are muddy pastures or corrals, filthy barnyards, the presence of loose stones in lanes, yards or corrals, neglected or poorly trimmed feet, small and uncomfortable stalls, and lack of bedding. Improperly constructed stalls or lack of sufficient bedding usually are predisposing factors when the hock joint is involved. In the correction of these conditions it is important to advise the client or the attendant to drain or fence mud holes, clean the lanes and barnyards, to make use of a "foot bath" (containing hydrated lime) at the stable entrance, and ample bedding in stalls.

In order to diagnose each individual case properly, the affected foot should be cleaned thoroughly with soap and water. Where it is necessary the hoof should be trimmed to a normal size and shape. A long hoof usually causes a sore foot. Emphasis should be placed on the proper trimming of the toe and also at the junction of the heel and sole. Many long-standing cases of lameness can be relieved by proper trimming of the feet. In case of infected lesions and/or hematomas and abscesses proper drainage must be established before any other treatment will be effective.

During the past few years we have used sodium sulfamerazine intravenously and sulfamerazine orally in the treatment of numerous infections in cattle with very gratifying results. With these favorable results in mind and realizing that the compound is safe for use in cattle when it is administered in therapeutic amounts, it was thought desirable that it be studied in the treatment of infectious or necrotic pododermatitis.

A report by Forman[1] on the use of a single intravenous dose of sodium sulfapyridine for the treatment of foot rot also helped to stimulate our interest in the use of sodium sulfamerazine in similar cases.

Infections Involving the Interdigital Space and Coronet

In a group of 118 cases that we have treated during the past year, 106 were in the acute, and 12 in the chronic, stage of infection. This condition frequently is referred to in our locality as "blind fouls." The animals apparently suffer great pain and discomfort, are quite lame, and show systemic symptoms such as mentioned above. These animals were properly restrained and the affected feet were washed with soap and water. They were examined also for the presence of foreign bodies. They were dairy cows or heifers, weighing from 800 to 1600 pounds. To each animal we administered, intravenously, 60 grams (approximately two ounces) of sodium sulfamerazine in 500cc of sterile distilled water. Within 24 to 48 hours following the treatment, 114 of the 118 animals showed a marked improvement; the intense pain and swelling had subsided. These animals recovered completely within three to five days.

Two of the four animals, that did not recover promptly, received a second dose of sodium sulfamerazine seven days after the initial treatment and improved satisfactorily within two weeks. The remaining two cows did not improve satisfactorily and eventually died. Post-mortem examination of these animals revealed abscesses in the liver. It is be-

[1] Forman, C. D. Single Injection Specific Treatment for Foot Rot in Cattle, *J. A. V. M. A.*, 109, p. 126. 1946.

lieved that the abscesses were due to a metastasis of the infection. It should be stated that the latter four animals were chronic cases which had existed for several weeks prior to treatment. In our experience early treatment of infectious pododermatitis is very important; when animals recently affected, are treated with sodium sulfamerazine intravenously the results usually are prompt and dramatic.

Infections Involving the Heels and Sole

During the past year we also have treated 31 cases in cattle (heifers and cows) where infections involved the heel and/or soles. These infections were more or less chronic or of long standing. We believe that the infection gained entrance into the bearing surface of the foot because of injuries caused by malformed feet (due to the improper care of the feet), nail puncture, or stone bruises.

Fourteen of the 31 cases were complicated with infected coffin joint. Three of these open joint cases were the result of a nail puncture. These animals were lame and apparently had infection in the feet for from two weeks to two months prior to our initial examination. Each animal was properly restrained, and the affected foot was thoroughly washed with soap and water and inspected. Necrotic tissue and foreign bodies were removed. The malformed oblong hoofs were trimmed. A "reducine pack"* was applied in each case. Each animal was given one 60 gram (approximately 2 ounces) of sodium sulfamerazine intravenously in 500cc of sterile distilled water. To the animals with infected coffin joints sulfamerazine was also given orally for two or three days at a dosage of 0.25 grain per pound of body weight, twice daily. In the 14 cases where the joint was involved, the sole was curetted in order to establish drainage. The wound and cavity were packed with sodium sulfamerazine powder and a gauze dressing was applied. In some cases a 10% solution of sodium sulfamerazine was left with the owner who was instructed to irrigate the joint cavity for four days. The animals were confined in a roomy, dry, well bedded stall. Twenty-five of the 31 animals improved very noticeably within four to five days and recovered completely in two to three weeks. Six of the 31 cases did not show appreciable improvement, as reported by the owner. Four of these six animals were examined once and not revisited by us. It is believed that one of them did not have "fouls" but a severely sprained fetlock joint.

*Reducine pack for local dressing:

℞
Pine Tar ..... 18 oz.
Soft Soap ..... 12 oz.
Methyl Salicylate ..... 1⅓ fl. oz.

Bruises and Infections of Hock and Stifle Joints

Traumatic injuries of the hock and stifle joints are observed frequently, especially in cows kept in narrow stalls with concrete floors. Such cases usually are seen in cows in the later stages of gestation or soon after parturition. The symptoms may vary from a slight swelling to an extensive edema for a considerable distance above and below the affected joint. The infection causes marked lameness, and some animals are reluctant to rise or move about. Five such cases were treated with a single, intravenous, 60-gram dose of sodium sulfamerazine. They improved very noticeably within four or five days. In cases where a localized abscess of hematoma can be determined it should be drained. This will aid in bringing about a more rapid recovery.

Dermatitis in Fetlock Region

Localized infection of the skin in the region of the fore or hind fetlock has been observed on a number of occasions. The lesions usually are most severe on the posterior surface. As a rule, the animals are quite lame. A considerable amount of necrotic tissue can be removed and a very foul odor is invariably present.

Foot rot is most prevalent during the winter season

Several such cases have been treated with a 60-gram dose of sodium sulfamerazine ad-

ministered intravenously. A "reducine pack" also was applied in some cases. All cattle that were treated in this manner recovered within a few days. In similar cases that were permitted to remain untreated recovery was delayed and there was always considerable sloughing of the skin around the fetlock joint of the affected limb.

Comments

When an infection in the feet of cattle is so severe as to cause spreading of the claws due to abscess formation, it is not to be expected that any single intravenous medication will entirely alleviate the condition. If there is an accumulation of purulent material or if infection of the joint is present, adequate drainage should be established and local treatment also should be applied. A loose covering or dressing should be provided to protect such a lesion from outside contamination.

It should be emphasized that early treatment of foot infections in cattle will facilitate prompt recovery, so that there is little or no loss of weight and only a temporary reduction in milk production in lactating cows.

Because of the pharmacologic characteristics of sulfamerazine we believe internal administration (intravenous or oral) is highly beneficial as an aid in the treatment of the conditions as described herein.

Discussion and Summary

In this communication we have attempted to describe briefly the most frequent causes of lameness in cattle. The conditions are serious in many instances and are cause for alarm both to the veterinarian and to the client. Veterinarians and animal husbandmen are well aware of the problems involved and the laborious work necessary to handle successfully many cases of lameness in cattle. Infections in the feet of cattle are often of a serious nature and, in cows, cause considerable decrease of milk production. To obtain the best results in the management of cases such as those described in this report, it is important to check carefully the entire herd and its environment. Correction of faulty management must be attained to achieve the desired results.

Animals suffering from lesions of the feet causing lameness, must be studied and treated carefully, promptly, and with effective agents in order to prevent more serious complications and sometimes the loss of the animal. Sulfamerazine and its sodium salt possess characteristics that provide two very desirable agents for use in the treatment of infections in cattle. We have had very gratifying results from these drugs in the treatment of metritis, mastitis, pneumonia and hemorrhagic septicemia as well as in infectious pododermatitis.

Efficient Help

For over 25 years we had an old cowboy helping us in our surgical and testing work. He was very quiet and gentle with animals and seemed to know just what to do at the right time.

He was an expert with a lariat, and could tie a colt or calf so it could hardly move. Our team work improved so that we became so expert that we could lead a big two-year-old colt out in an orchard, restrain him and have the operation over in less than ten minutes. He would put the big leather halter we carried on the animal in the barn, and before it knew what was happening, or could become excited, it was down on its side, firmly tied up. He took genuine pride in his work and his work justified his pride.—E. T. BAKER

Magnitude of Army Food Inspection

All food of animal origin procured for the armed forces by the Quartermaster General received inspection by Veterinary Corps personnel to insure that it was wholesome, of the designated grade, and properly packed to withstand the rigors of wartime shipping. Inspection at time of procurement reached its height in June, 1945, when a daily average of 36,137,901 pounds of meat and dairy products was inspected. In addition, all foods were reinspected many times—in storage, in transit, and at time of issue, both in the zone of the interior and in all overseas theaters. During April, 1945, a peak load of over 22,500,000 pounds of foods of animal origin were being inspected daily by the veterinary service as issued to troop messes. By an agreement between the War Food Administrator and the Under Secretary of War, concluded in 1944, Army veterinary personnel were employed for antemortem and post-mortem inspections at slaughter and packing plants having contracts for supplying meat to the Army and, by further agreement in 1945, boneless meat produced under Veterinary Corps supervision was marked with the Federal Meat Inspection stamp. Foods of all kinds procured in foreign countries also received veterinary inspection. This included billions of pounds produced in New Zealand and Australia to support United States forces in the Pacific. It also included the supervision of milk supplies and slaughter of thousands of cattle, swine, lambs, and poultry for American troops in disease-ridden countries of Africa and Asia. In the year or so preceding the termination of the fighting, the Medical Department, in cooperation with the Chemical Warfare Service, developed and standardized a screening kit for detection of poisonous chemical warfare agents in food.—*Bul. U. S. Army Med. Dept.*, 7:7, p. 609. 1947.

The Fight Against Foot-and-Mouth Disease in Britain and Europe

By W. LYLE STEWART, M.R.C.V.S.
Newcastle-on-Tyne, England

FOOT-AND-MOUTH disease, or infectious aphtha, is an acute and highly infective disease of animals and occasionally of man. Cattle, pigs, sheep and goats may be infected easily by a single, short exposure to the virus, and the disease is consequently readily spread. Spread from farm to farm, it most commonly occurs from the movement of apparently healthy livestock which are in the incubative stages of the disease, but may also be brought about by rats and hedgehogs and other animals. Birds may carry the infection on their feet. Contaminated fodder, infected clothing and boots may also spread the disease, because the virus of foot-and-mouth disease has considerable power of survival outside the body of the living animal.

In adult animals the death rate is usually low, perhaps 1% or 2%, but may rise to 40 to 50% in young animals, where there is a greater chance of complications. A less common but more malign type of foot-and-mouth disease is also occasionally encountered in Britain. This type causes a much higher mortality than the usual type.

Foot-and-mouth disease has, at times, prevailed in nearly all parts of the world; climate being no barrier. In Britain the disease is sporadic and for this reason shows several interesting features. In the first place, although foot-and-mouth disease is enzootic on the European Continent, it is not so in Britain, since the North Seas affords some measure of protection, and has enabled control by eradication both possible and successful. Again, the British policy of eradicating the disease by the immediate slaughter of all infected and in-contact animals, shuts out the possibility of animals acquiring any natural immunity. Indeed, the livestock in Britain forms a highly susceptible population, so when outbreaks occur interesting observations can often be made on the virulence of infecting types and strains, also on the dissemination and related matters.

Since normally Britain is free from foot-and-mouth disease it may be instructive to inquire in what way the infection is at times introduced. There are two known routes of infection and possibly several unknown: (1) in chilled or frozen meat imported from infected countries, and (2) extension from the European Continent by migrating birds or other means.

Introduced with Imported Meat

There is now a substantial volume of evidence showing that foot-and-mouth disease may be readily introduced into Britain with imported meat, chilled or frozen. The causative microörganism — one of the filterable viruses—is remarkably tolerant of low temperatures. It can survive for over three months in frozen meat and for at least six weeks in the bone marrow of pigs after wet salting; therefore if cattle in the exporting countries happen to be slaughtered when in the early and non-detectable phase of the disease, the meat and offal will be infective for livestock when it reaches Britain.

This route of infection was suspected long before it was proved, and for years it has been obligatory on all swine raisers to boil raw garbage, from hotels, restaurants, canteens, etc., for one hour to render it safe, before feeding it to swine. Unfortunately this simple precaution has not always been properly carried out. In 1944, for example, there were 93 initial outbreaks of foot-and-mouth disease in Britain, and in no less than 78 the disease first appeared among swine. In practically every case uncooked garbage had been brought to these premises for pig-feeding. It is instructive to note that garbage from the United States' service establishments was not incriminated in a single outbreak. The explanation is at once obvious: these camps drew their meat supplies from the North American Continent, where the disease does not exist. On the other hand the only infected countries exporting to Britain at that time were the South American Republics, and the above repeated infections were undoubtedly derived from them.

Much discussion has centered round the question of infection from the Continent of Europe. The English Channel and even the North Sea form only relative and by no means absolute barriers to the extension of foot-and-mouth disease from the European Continent. An example of this may be taken from 1937, when France was infected with the disease

from Morocco. The outbreaks spread rapidly through France, Belgium, Germany, Denmark, Poland and Czechoslovakia, involving millions of cattle and inflicting enormous losses. In Germany alone there were 600,000 recorded outbreaks in 1938, and the losses were estimated at 80 millions sterling. Britain did not escape. About 250 outbreaks occurred in the southern counties of England, and not only did they coincide in point of time with the European outbreaks, but the disease also conformed in type. Many of these outbreaks started among grazing cattle, and the evidence pointed strongly to flocks of migrating birds acting as carriers of the disease, although the infection could assuredly also have been carried by other, even human agencies.

There is then little doubt that birds can and do introduce infection, and Britain's chief hope for the closure of this portal of entry lies in the utilization of effective prophylactic measures on the Continent. In the landlocked countries of Europe it is understandable that an eradication policy is virtually impossible to carry out, and mitigation of the serious losses which the disease occasions is to be sought for in efficient immunization.

Standstill Order Imposed

The State Regulations for dealing with outbreaks of the disease in Britain are prescribed under the Contagious Diseases of Animals Acts, and provide for notification, diagnosis and eradication. Whenever the disease is confirmed a standstill order is imposed for miles around, and movement of livestock into or out of this area is prohibited, except for food animals destined for immediate slaughter. This checks spread and meanwhile veterinary inspectors patrol the area and check up on recent cattle movements. Eradication is commonly termed the "slaughter policy" and this entails the killing of all infected and in-contact animals, and following up with a thorough cleansing and disinfection of the infected premises. Restocking is permitted in about two months. From time to time this policy runs the gauntlet of public criticism, much of it misinformed. While no one regards it as the best policy, it is undoubtedly the best policy for Britain that we know of at present. And, in the light of experience, it has proved economically sound. Whenever a better plan is discovered Britain will no doubt adopt it, but meanwhile most emphasis is placed on prevention, and interest in vaccines, serums and cures is of indirect importance.

Regarding the immunological aspect of control, it is of the utmost importance to realize that there are three quite distinct types of virus, named A, O and C. These three virus types give rise to the same clinical form of the disease, but are immunologically distinct, so that it is possible for an animal to have three attacks of foot-and-mouth disease in quick succession. This plurality of virus types complicates the question of immunity. Nevertheless, a natural attack confers immunity for more than a year against the same type of virus, and this knowledge provides a convenient starting point for all schemes of artificial immunization. These may be described briefly:

1. *Convalescent Serum.*—A passive immunity may be imparted to healthy animals by injecting blood plasma from cattle which have fully recovered from a natural attack of the disease. The effect is temporary, but may be useful in tiding susceptible animals over a period of danger.

2. *Hyperimmune Serum.*—Since this serum is produced by serum-making animals in special establishments, it is far more potent than convalescent serum and, moreover, may be polyvalent, that is, effective against more than one type of the virus.

3. *Vaccines.*—Convalescent and hyperimmune serum may be of the utmost value in protecting animals from immediate danger, but their action is transient and the ultimate hope for efficient control lies in vaccination. The problem is a highly technical one, for the ideal vaccine must fulfill many exacting conditions. It must be safe to use, effective against all common virus types and inexpensive to prepare, since control by vaccination implies its use in probably millions of cattle as well as sheep and goats. The principle of preparation is to treat the foot-and-mouth disease virus with chemical reagents to render it non-infective and at the same time to avoid any loss of its immunizing properties.

The crystal violet vaccine first made in Switzerland is of this type, and has undergone tests in South America, but the writer has no knowledge as to its general effectiveness. Waldmann's vaccine has been extensively used on the European Continent and is prepared by treating the virus and tissues containing it with aluminum hydroxide and formalin. This vaccine is again being produced in a special institute in Switzerland. Several millions of cattle have been treated with Waldmann's vaccine and the resulting immunity is said to last for six to eight months. Reinfection of animals does sometimes occur, but this is mostly due to an incursion of a different type of virus.

European veterinarians are confident that the early and compulsory use of vaccines will effectively control spread of the disease, and are continuing their efforts in this direction. It is earnestly hoped that events will justify this optimism.

Hemorrhagic Septicemia in Swine Controlled with Sodium Sulfamethazine

By OWEN K. FOX, V.M.D.
Mt. Holly, New Jersey
and ROBERT L. BURKHART, V.M.D.
Pearl River, New York

HEMORRHAGIC septicemia, swine plague, or pasteurellosis, is an infectious disease caused by a specific organism, *Pasteurella multocida*, which is widespread in nature, and may be found in the air passages and intestinal tracts of apparently normal hogs. There has been some question[1,2] as to whether pasteurellosis ever occurs in the United States as a specific disease, or whether it is seen more often as a complication or secondary infection in other diseases, such as hog cholera or swine influenza. However, it has been reported[3,4,5,6] that it does occur as a primary disease, particularly as a pulmonary infection. This organism, a normal inhabitant of the respiratory tract of swine, may become invasive when the vitality of the host is reduced by chilling, exhaustion, parasitism, or a like condition. The virulence of the organism may become increased during the course of the disease by animal to animal passage, so that, directly or indirectly, even the less susceptible pigs become infected.

In the early winter of 1946, an outbreak of pasteurellosis occurred on a New Jersey farm, in a herd of approximately 400 swine. There was, on this farm, a history of disease outbreaks, occurring during the winter months of 1942 and 1945, when approximately 50% of the herd showed symptoms similar to those described in this report. In the outbreaks in those years all affected animals died. The farm conditions were, in general, fair. All the animals raised were farrowed on the premises and were fed uncooked garbage. The breeding

animals were maintained separate from the growing pigs, and the growing pigs were segregated in groups of approximately 100. Vaccination for the prevention of hog cholera, using the serum-virus method, was routine procedure each year at time of weaning or shortly thereafter.

At the start of the outbreak here reported, hog cholera was suspected, and hog cholera antiserum, in the recommended dosage, was used three times without response; a combined sulfonamide treatment, sodium sulfathiazole and sodium sulfapyridine, failed to reduce losses; and hemorrhagic septicemia bacterin, used as a therapeutic agent, had no beneficial effect.

Clinical Description

The disease was characterized by sudden onset and rapid course. There was a moderate rate of spread in the herd. Symptoms were observed in animals of all ages, but the majority of those infected were in the 30- to 50-pound range. However, some mature animals also died.

The first symptoms noted by the owner were complete inappetence followed by diarrhea. The pigs then became inactive and were reluctant to move. Breathing became labored and a copious mucoid discharge from the eyes and nose was observed. Temperatures taken at random among the affected groups ranged from 104° to 105° F. As the disease progressed, extreme physical weakness was apparent, dyspnea became more pronounced, and the animals became comatose and died. From the onset of the disease to the start of treatment, 80 pigs, or 20% of the herd died.

Gross Pathology

Autopsies were conducted on four pigs which died with typical symptoms and temperatures above 104° F. Both lungs appeared to be consolidated on palpation; however, on cut section, the increase in density appeared to be due primarily to edema and hemorrhage. There was an extensive fibrinous exudate of the tracheal-bronchial tree. The spleen was slightly enlarged. The liver was slightly en-

larged and showed interstitial hemorrhages with congestion. The submaxillary and mesenteric lymph nodes were markedly swollen and hemorrhagic. Petechial hemorrhages were abundant in the mucous membrane of both the small and large intestines. The kidneys showed a few subcapsular petechial hemorrhages. Other organs examined showed no evidence of gross pathology. No histological studies were made.

Bacteriology

Liver, lung, spleen, and kidney tissues were submitted for laboratory examination. The tissues were combined, ground, and a composite sample taken. Each of three mice was injected intraperitoneally with 0.5cc of the culture suspended in hormone broth. All mice died within four days, and an organism was isolated in pure culture from the heart's blood. This organism was a small, gram-negative rod, showing bipolar staining and no endospores, identified as *Pasteurella multocida*, Type I, by the standard identity tests.

Procedure

Infected pigs were divided into three groups for therapy, according to the duration of the disease. Group I included 20 pigs, weighing between 30 and 100 pounds, where treatment was instituted two days after the appearance of symptoms; Group II included 12 pigs, weighing between 15 and 30 pounds, with symptoms of five days' duration; Group III included five pigs, weighing between 25 and 30 pounds, with symptoms of two weeks' duration.

Sodium sulfamethazine 25% w/v sterile solution was administered subcutaneously, at 24-hour intervals, to all groups, at the rate of 1½ grains per pound of body weight on the first day, and 1 grain per pound of body weight on the second and third days.

Management was the same for all the groups. Temperatures were taken by random selection of treated animals on the first, second, and third days of treatment. The infected pigs were checked for appetite, activity, diarrhea, and mortality for the duration of, and, at 2-weeks' intervals, for six weeks following, the treatment period.

Results

In Group I, there were no deaths. Clinical improvement was apparent within 24 hours, and, within three days, the pigs were active, appetites were good, and diarrhea had ceased. The temperature range was from a high of 106.2° F. on the first day, to normal on the third day.

Of 25 animals which might have qualified for Group II, 12, or approximately 50%, had died before treatment was instituted. The twelve pigs of Group II had eaten nothing for four of the five days of their illness. Following the administration of sodium sulfamethazine, temperatures, which had ranged from 104° to 106° F., decreased more slowly than in the first

TABLE I.—SUMMARY OF RESULTS OF TREATMENT OF AN OUTBREAK OF HEMORRHAGIC SEPTICEMIA IN A HERD OF SWINE WITH 25%W/V SOLUTION OF SODIUM SULFAMETHAZINE SUBCUTANEOUSLY, 1½ GR./LB. BW 1ST DAY, 1 GR./LB. BW 2ND AND 3RD DAYS

Group	No. of animals treated and weight	Clinical conditions at start of treatment	Results of treatment				
			1st day	2nd day	3rd day	7th day	6 weeks
I	20— 30 to 100 lbs.	symptoms 2 days' duration no deaths	Temp.*—105.4° inappetence inactivity diarrhea	103.6°* fair appetite little activity slight diarrhea	normal normal normal normal	normal normal normal normal	normal no relapses
II	12— 15 to 30 lbs.	symptoms 5 days' duration 12 deaths	Temp.*—105.2° inappetence inactivity diarrhea	105.0°* slight appetite little activity slight diarrhea	104.3°* normal fairly active normal 1 death	normal normal normal normal	substantial weight gains in 11 animals
III†	5— 25 to 30 lbs.	symptoms 2 weeks' duration 20 deaths	Temp.**—106.6° inappetence inactivity diarrhea	105.1°* inappetence inactivity diarrhea 1 death	103.2° slight appetite little activity diarrhea 1 death	poor response 2 deaths (remaining animal died 3 days later)	

*Average of 4 pigs picked at random.
**Average of 3 pigs picked at random.
†Group III was treated 3 times before sulfonamide therapy with hog cholera antiserum, and hemorrhagic septicemia bacterin.

group; all but one, which died on the third day, improved clinically within the three-day treatment period. At the end of one week, all temperatures were normal, appetites were good, the animals were apparently fully recovered, and no additional deaths had occurred.

Of 25 pigs in the 25- to 30-pound weight class, which had been ill for two weeks, 20, or 80%, died before treatment was started. These pigs had been treated three times with hog cholera antiserum and hemorrhagic septicemia bacterin, without favorable results. After sulfamethazine treatment of the five pigs of Group III, temperatures remained high, ranging from 106° to 107° F., with only one animal showing a temperature drop to 103.2° F. There was one death among the treated animals on the second day of therapy, and one on the third day. The remaining pigs responded poorly, and one week later, all but one had died. This animal showed some improvement, but died three days later.

Two pigs, in the 30- to 100-pound group and the 15- to 30-pound group, respectively, were not treated. Both pigs died within seven days of the start of illness.

All the treated pigs were observed for six weeks, at two-week intervals, after completion of treatment. All pigs remained healthy, the appetites were good, and substantial weight gains were made.

Table I summarizes the results of treatment in all three groups.

Discussion

Clinically, the history, symptomatology, and post-mortem findings in the individual cases were very suggestive of hog cholera. Moreover, the animals were fed raw garbage. However, there were several cogent reasons for not making that diagnosis. The hogs had been immunized at weaning, and even mature, inoculated animals became infected. Hog cholera antiserum had no apparent effect. The finding of fibrinous exudate in the bronchi and lungs is not characteristic of hog cholera. Finally, the isolation of a pure culture of *Pasteurella multocida* from the heart's blood of mice inoculated with tissues of dead animals, seemed to justify the diagnosis of pasteurellosis.

An analysis of the results of this trial indicates that sodium sulfamethazine, at the therapeutic levels used, was effective in the treatment of swine pasteurellosis. The number of treated swine was small, and the great losses of animals before the treatment program was started did not justify provision for adequate controls. The striking improvement noted on the second and subsequent days of treatment in Group I left little doubt that this type of therapy was responsible for the results noted. Likewise, the animals which had been ill for five days showed improvement within 24 hours of the institution of treatment. As might be expected, the results were very poor in Group III, where the disease was well established.

The action of sulfonamides is essentially bacteriostatic, and early treatment enables the defensive forces of the body to eliminate infection. This action is much less effective when a tissue barrier or inflammatory stasis is to be overcome, as may be the case in established infections. As infection continues, with resultant by-products such as pus or tissue-irritating substances, it becomes increasingly difficult to establish an effective concentration of the drug at the site of infection. Therefore, in animals where the infection has been of several days' duration, it is often desirable to increase the dosage 50 to 100%, when dehydration or nephritis is absent.

In this particular trial, facilities did not readily permit the determination of blood levels. It has been found[7] that swine, treated at the dosage rate used in this trial, establish blood levels ranging from 5 to 12mg per 100cc of blood, during a 24-hour period. This is considered to be well within the therapeutic range.

Summary

An outbreak in a herd of swine, diagnosed as pasteurellosis by typical symptoms, post-mortem findings, and the isolation of *Pasteurella multocida*, is described.

Sodium sulfamethazine 25% w/v sterile solution, injected subcutaneously, once a day for three days, at the rate of 1½ grains per pound of body weight on the first day, and one grain per pound of body weight on the second and third days, provided adequate therapy when treatment was administered early in the outbreak. Delay in instituting treatment decreased the percentage of recoveries.

Bibliography

1. Schalk, A. F., and Roderick, L. M. Pathogenicity of *Bacterium suisepticus* for hogs. *J.A.V.M.A.*, 62 (n.s. 15), p. 343 (Dec.). 1922.

2. Runnells, R. A. Animal Pathology. Iowa State College Press, Ames, Iowa, pp. 518. 1946.

3. Kinsley, A. T. Hemorrhagic septicemia (swine plague). *Vet. Med.*, 43:3, p. 150 (March). 1937.

4. Hagan, W. A. The Infectious Diseases of Domestic Animals. Comstock Publishing Co., Ithaca, p. 161. 1945.

5. Schofield, F. W., and Ingle, R. T. Natural and experimental hemorrhagic septicemia in swine. Rept. Ont. Vet. College, p. 23. 1940-41.

6. Hutyra, F., Marek, J., and Manninger, R. Special Pathology and Therapeutics of the Diseases of Domestic Animals, Vol. I. Alexander Eger, Inc., Chicago, p. 145. 1946.

7. Welsh, Mark. Personal communication.

Cardiac Disease in Dogs and Cats Successfully Treated with Vitamin E*

By N. H. LAMBERT, M.R.C.V.S.
Dublin, Eire

THE treatment of coronary heart disease with ephynal (d-1 alpha tocopherol acetate) was first reported by Vogelsang and Shute (1946). They noticed that those purpuric patients under treatment with vitamin E who also had heart lesions were very much improved. This suggested an extension of the work, so clinical trials were instituted and a publication by Vogelsang, Shute and Shute (1947) followed.

Cases were treated with high dosage of vitamin E, and all patients in the series having anginal pain showed a great reduction in its severity or its complete abolition. Exercise tolerance was increased, edema disappeared and all patients had an increased feeling of well-being.

The possibility of using this form of treatment for dogs and cats suggested itself to me and a series of cases was embarked upon. Details from some of these are given below.

Case 1.—A Griffon bitch 11 years of age was dying after weeks of treatment for metritis and endocarditis. The metritis had improved but the heart was rapidly becoming worse. The owner implored me to try anything to save the bitch's life. The report of Vogelsang & Shute (1946) on vitamin E came to mind, so I decided to try this treatment, though the bitch was having frequent heart attacks, was almost too weak to stand, had to be hand-fed with liquids, and was much wasted. "Ephynal," 3mg (vitamin E), was given t.i.d. After the first day a slight improvement was noticed. This improvement was maintained and in 14 days the dog was running around, looking for food and barking. She received two tablets daily for a month and her owner stated that she appeared younger in her ways than for the past three years. The result was spectacular. She is now in perfect form and is still on one tablet daily nearly 12 months after treatment started. She is rejuvenated, plays like a pup, has a fine glossy coat, and has had her first normal heat in four years, followed by a phantom pregnancy.

Case 2—A 12-year-old cocker bitch, when seen was off feed, very weak, and preferred sitting up to lying down, a common position for dogs with cardiac lesions. Hers was an advanced case of endocarditis. One 3mg ephynal tablet was given *per os* t.i.d. for 14 days, then b.i.d. for a further 14 days, and finally one tablet daily for a third 14-day period. This bitch made a remarkable recovery; improvement was noticed after only a few doses. She coughed less, lay flat and was feeling well on the second day. Now the owner says she is younger in her ways than for the past five years. She is still in good health, six months after discontinuance of the treatment.

Case 3.—A 12-year-old fox terrier dog had been coughing and for some weeks showed a disinclination to go for walks. When first seen he was very weak, refused food and, on examination, was obviously an advanced case of endocarditis. He was given one 3mg ephynal tablet t.i.d. for 21 days, then one b.i.d. for 14 days, and finally one daily for an additional month. The dog improved slowly, and the owner now reports that it is rejuvenated and playing like a pup. It has not been examined since November, when the appearance was one of normal health.

Case 4.—A 10-year-old cocker dog was brought in for consultation because of anal abscess; a chronic cough was also mentioned. On auscultation endocarditis was easily detectable. The abscess was treated by usual methods and ephynal treatment instituted. The cough cleared in a week. Again the owner reported that the dog was rejuvenated.

Case 5.—A male red setter eight years of age had a large anal adenoma which was reacting to treatment with stilbestrol. The owner wanted to continue using the dog for shooting, which was permitted. Six weeks later he was brought in again. He was extremely wasted, coughed a great deal, was very distressed and, according to the report of the owner, had collapsed several times whilst out shooting.

Examination revealed advanced endocarditis and cardiac dilation. One 10mg ephynal tablet was given b.i.d. *per os* for 14 days and then one tablet daily for 21 days. An immediate improvement was noticed by the owner. A week later the dog had put on a little flesh, was in good form and breathing normally. Gradual increase in the diet and exercise was advised and "work" forbidden. Stilbestrol treatment was continued throughout as the anal growth was diminishing. When examined three weeks later a big improvement was noted and the amazing thing was that the owner said he had just returned from giving the dog three days' shooting and he was nearly as good as ever.

*Reprinted from *Vet. Rec.* 59:27, pp. 355-356, (July 19) 1947.

Case 6.—An 11-year-old Yorkshire dog was having heart attacks and also suffering from deafness and defective vision. Auscultation revealed advanced endocarditis and myocarditis; one 3mg ephynal tablet was given three times a day and, although improvement was slow, after a week the number of tablets was reduced to two daily. Three weeks later he was much better, the heart attacks had ceased and his sight and hearing were improved. He was also less nervous. The owner said that the dog was in better health than for the past 12 months. Treatment was discontinued, and within a few days the dog relapsed slightly. He began to cough, appeared distressed, and again became deaf. When treatment with ephynal tablets was again instituted the symptoms abated. He is now on one tablet daily and is in marvelous form, four months from the commencement of treatment.

Case 7.—A 16-year-old neuter cat collapsed in what appeared to be a heart attack. It had a very rapid, weak pulse and a staggering gait on mounting two steps. It was given one 3mg ephynal tablet for a week t.i.d., then b.i.d. for a week and finally one tablet daily. The cat made a remarkable recovery, has developed kittenish habits and looks younger than it did five years ago. It is still on one tablet every second day, three months after beginning of treatment.

So far about 50 cases have been treated with this preparation of d-1 alpha-tocopherol acetate (vitamin E) and practically all show considerable improvement in their cardiac and general condition. Evidence of endocarditis remained after treatment, but a considerable improvement was noted in the strength of the heart beat.

Discussion

The question of the possible mode of action of vitamin E in these cases has, naturally enough, engaged my attention, and this point is also raised in the *British Medical Journal* (1946). The *B.M.J.* expert, replying to a question on vitamin E in auricular fibrillation, says: "Apart from the Canadian claims on which this question is based, reasons for testing vitamin E in the treatment of certain forms of heart disease might have been inferred from the results of animal experiments, since muscular lesions, sometimes accompanied by degeneration of the nerves, are a prominent feature in avitaminosis E." Also pointed out is the fact that in the rat the E deficiency is characterized by the deposition of dark brown pigment granules which, when examined histologically, appear to be identical with those seen in brown atrophy of the senile, human heart.

It is interesting also to note that Govier, Yanz and Grelis (1946) suggest an explanation for a possible biochemical lesion in congestive heart failure. They propose that chronic anoxia might produce a defect in the intracellular linkages of alpha-tocopherol so that a relative E deficiency may be produced in the same way that co-enzyme deficiencies are produced in tissues in shock (Govier, 1944). In congestive failure cardiac muscle is known to have a low creatine level as also has E deficient muscle. This might suggest avitaminosis E in both cases. (Houchin, et al., 1942; Herrman, et al., 1936, 1943). This relative deficiency might then allow functioning of co-enzyme I nucleotidase in a system already anoxic, resulting in the breakdown of co-enzyme I, which is known to occur in heart muscle (Govier, 1945). The co-enzyme I breakdown might lead to damage to heart metabolism. Alpha-tocopherol could be expected to preserve cozymase by the inhibition of cozymase nucleotidase. This would allow of a more normal metabolism.

Observing the rejuvenation in most cases, the action of vitamin E on the gonads must also be considered.

Further, work on cardiac failure in cattle on vitamin E free rations and controlled by electro-cardiograms reported by Gullickson & Calverley[1,2] (1946) shows that a considerable number of animals fed on a vitamin E deficient diet died suddenly and, although there was no evident cause shown by post-mortem examination, the manner and suddenness of the deaths suggested that the heart was involved. One case mentioned in particular was a heifer whose dam and sire were both raised on vitamin E free rations, as was the heifer itself, which showed by E.C.G. a decreased functional activity of the myocardium in the terminal stages of the deficiency, as indicated by the decrease in the potential of the deflection of the Q.R.S. complex and by the increase in duration of the P.R., Q.R.S. and Q.-T. intervals.

References

Vogelsang & Shute. *Nature*, 157, 772. 1946.
———, Shute & Shute. *Med Rec.*, N. Y., 160, 21. 1947.
"Questions and Answers." *Brit. Med. J.*, 2, 562. 1946.
Govier, Yanz & Grelis. *J. Pharmacol.*, 88, 373. 1946.
———. *Am. Heart J.*, 29, 334, 1945.
———. *J. Am Med. Assn.*, 126, 749. 1944.
Gullickson & Calverley. *Science*, 104, 312. 1946.
Houchin, Boyd & Mattill. *J. Biol. Chem.*, 146, 301. 1942.
Herrman & Dechard. *Trans. Assoc. Am. Phys.*, 52, 85. 1943.

[1] Vitamin E deficiency and sudden death in cattle. *Vet. Med.* 42:1, p. 38, (January) 1947.
[2] Toxic heart degeneration in fowl. *Vet. Med.* 42:1, p. 196, (May) 1947.

Use of Gelatin Solution as Plasma Replacement Therapy

By J. L. HOPPING, JR., D.V.M.
Atlanta, Georgia

THE use of intravenous infusion of gelatin was reported in 1915 by Hogan[1] who observed that in shock, saline solutions escaped through the blood vessel walls and therefore were not of much value in treating the signs and symptoms of circulatory failure. Six patients with severe collapse due to various causes showed good recovery after the intravenous injection of 500cc of gelatin solution. This therapy was then abandoned due to impurities in gelatin and the report that gelatin caused intravascular clotting.

In 1929 interest was again revived by Wolfson and Teller.[2] About this same time it was shown that gelatin rendered ash-free by dialysis did not produce capillary changes as evidenced by pseudo-agglutination of the red blood cells.

It is now well known that the ordinary infusion solutions (physiological salt solution, Ringer's solution, Locke's solution) stay in the blood vessels but a short time, and consequently the improvement, which is marked almost immediately, often wears off within an hour or so. On the other hand, it is known that colloidal solutions will remain in the blood vessels for a considerable time.[3]

The collodial property of gelatin is the protein molecule which is too large to permeate the vessel walls and thus holds blood fluids within the vessels themselves.

The osmotic pressure of a solution is found to be, by whatever method it is measured, in direct relation to the molecular concentration.

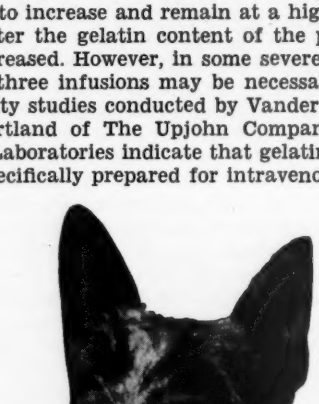
The administration of gelatin in saline solution or in distilled water has been found to exert a favorable influence on plasma volume and blood pressure. The gelatin particles act to exert a satisfactory colloidal osmotic effect, thus retaining within the blood vessels, water and electrolytes. This effect helps to maintain a normal electrolyte pattern and proper fluid balance between the various parts and keeps the tissues in a state of normal permeability.

It is believed that in shock-like conditions a change in the capillaries occurs, causing lack of tonus, dilatation, slowing of the blood flow, stasis, increased permeability to blood plasma, and edema. With the continued loss of plasma volume through the permeable capillary walls, a fall in blood pressure occurs and a state of shock is present. Where loss of fluid is caused by hemorrhage, a similar train of events occurs. The loss of tone of the capillaries, stasis, poor return of blood, and the continued loss of fluid result in an inadequate supply of oxygen to the tissue cells. The tissue anoxia further increases the permeability of the capillaries and the condition is aggravated.

The effects of gelatin solutions given intravenously in human beings not in shock and in shock has been studied.[4] It was found that gelatin exerted a satisfactory colloidal osmotic effect as shown by demonstrations of significant increases in plasma volume in all patients not in shock and a large percentage of patients in shock.

While the colloidal osmotic properties of gelatin solution gradually subside as the gelatin is eliminated in the urine, one infusion may be sufficient to effect permanent relief from a state of shock and cause the plasma volume to increase and remain at a high level even after the gelatin content of the plasma has decreased. However, in some severe cases, two or three infusions may be necessary.

Toxicity studies conducted by Vander Brook and Cartland of The Upjohn Company Research Laboratories indicate that gelatin solutions specifically prepared for intravenous use



The injured scottie did not recover regardlesse of treatment (31)

are nontoxic. Injected intravenously in rats in doses ranging upward to 50cc per kilogram of body weight and equivalent to 3,500cc for man, this gelatin solution caused no ill effects. Rabbits bled by cardiac puncture and injected with an equal volume of gelatin solution twice weekly for four weeks, maintained their weight satisfactorily and showed no deleterious effect from this procedure other than a reduction in hemoglobin due to repeated blood withdrawals.

Dogs, bled at weekly intervals for twelve weeks, one-half their estimated blood volume being withdrawn at each bleeding, and this

blood being replaced with gelatin solution equal to 80% of the blood removed, showed no ill effects.

Both experimental and clinical findings show that gelatin solution satisfactorily maintains circulatory volume and blood pressure in various types of shock and exhibits properties similar to those of actual blood plasma.

The sedimentation rate is increased greatly, but return to normal as the gelatin leaves the blood stream and is excreted in the urine.

Microscopic examination of the heart, arteries, veins, lungs, stomach, gall bladder, intestines, adrenal gland, spleen, and muscle from dogs receiving gelatin infusions showed no pathologic change traceable to gelatin infusions. Certain gelatin infusion solutions that contained a preservative produced in some instances thrombosis of the infused vein following one injection. With gelatin solutions containing no preservative such local thromboses did not follow single injections. However, upon repeated injections into the same vein gelatin solutions without preservative did cause thrombosis. To eliminate the chance development of thrombosis, therefore, it is advisable to avoid employing the same vein for administering multiple injections of gelatin.

Histologic examination of the kidney of gelatin-injected dogs showed that epithelial cells of the proximal convoluted tubules were dilated and occasional cells were vacuolated, presenting a picture which has been described as a protoplasmic disturbance, probably produced by the excretion of gelatin. In no instance was frank tissue damage such as necrosis observed.

The effectiveness of gelatin solution in preventing experimentally induced shock in dogs was studied by a group of Princeton investigators.[5] These workers showed that as far as could be judged by the effect on blood pressure, hematocrit and hemoglobin changes gelatin was approximately as effective as plasma in traumatic shock. Gelatin infusions were effective in maintaining blood pressure and preventing hemoconcentration in 73% of traumatized animals. Similar amounts of pooled, heparinized dog plasma administered in a similar manner, proved no more effective in preventing shock than gelatin.

Studies on the fate of gelatin injected intravenously in man indicate that up to 80% is excreted in 48 hours. Blood urea and blood amino acid levels were not increased by gelatin administration. This indicates that the retained gelatin is not utilized as a nutrient and that gelatin infusions cannot serve from a nutritional standpoint as a source of protein.

It has been shown that gelatin solutions, properly prepared and controlled, were suitable for intravenous injection without evidence of producing sensitization and without histological or clinical evidence of toxicity or irreversible accumulation.[6]

In order to appropriately use gelatin solutions for intravenous work, they must be prepared from approved source material under rigid physiochemical and biologic control.

A proper gelatin solution is one that is treated by electrodialysis and by heat under pressure, clarified, and rendered pyrogen free. The final solution made up to 5%, in either

The result was favorable even following cesarean section and metritis (40)

isotonic solution of sodium chloride or in distilled water, is autoclaved for a proper period to produce the desired molecular size.

Application in Veterinary Medicine

From experimental and clinical reports the use of gelatin solutions as a blood plasma substitute has several indications in veterinary medicine.

In such conditions as traumatic and surgical shock, loss of blood, and in those conditions of extreme stress where dehydration and hemoconcentration may be apparent,[7] gelatin is of value.

The following case reports concern the application of 5% purified gelatin in isotonic solution of sodium chloride* in both small and large animals. The dosages ranged from 10 to 500cc in small animals and 500 to 1500cc in large animals with generally satisfactory clinical results. Gelatin solution was administered as supportive treatment with a view to exerting a favorable influence on plasma volume and blood pressure. In those cases suffering from specific diseases or pathologic conditions, recognized therapy was administered in addition to gelatin solution, according to each individual clinical picture.

It can be expected that gelatin solutions may be used as replacement therapy in most

*Five per cent Purified Gelatin in Isotonic Solution of Sodium Chloride was supplied through the courtesy of the Department of Veterinary Medicine, The Upjohn Company, Kalamazoo, Michigan.

TABLE I—SUMMARY OF INTRAVENOUS USE OF PURIFIED GELATIN IN ISOTONIC SOLUTION OF SODIUM CHLORIDE IN THE TREATMENT OF SHOCK AND RELATED CONDITIONS

Species; breed	Age	Temperature	Diagnosis	Condition	Av. Wt.	Date injected	Amount injected	Result
1. Bovine	8 yrs.	105	pneumonia	poor	1000	3/20/45	500cc	died
2. Cocker	4 yrs.	99.0	poison	poor	45	4/18/45	150cc	favorable
						4/20/46	175cc	
3. Pointer	6 yrs.	103	metritis	fair	60	5/10/45	100cc	favorable
4. Boston	3 yrs.	101.2	snake bite	poor	20	5/20/45	75cc	favorable
5. Amer. Bull	5 yrs.	100	internal injury	fair	50	6/3/45	125cc	favorable
6. St. Bernard	6 yrs.	100	parasitism malnutrition	poor	75	7/23/45	150cc	favorable
						7/25/45	175cc	
7. Boston	7 yrs.	103.4	pneumonia	fair	20	8/10/45	100cc	died
8. Pointer	6 yrs.	101.6	gastritis	fair	40	9/27/45	200cc	favorable
9. Fox Terrier	7 yrs.	101	gastritis	poor	17	9/23/45	75cc	favorable
						9/24/45	100cc	
10. Cocker	1 yr.	103.8	distemper	poor	20	9/26/45	50cc	slight response
						9/27/45	100cc	died
11. Pointer	1 yr.	104.2	distemper	poor	35	9/28/45	100cc	died
12. Collie	3 yrs.	101.8	amputation	fair	65	10/2/45	150cc	favorable
13. Cocker	4 yrs.	104	intestinal toxemia and jaundice	poor	25	9/30/45	100cc	favorable
						10/1/45	200cc	favorable
						10/4/45	250cc	died 10/5/45
14. Cocker	2 yrs.	98.2	poison	poor	35	10/16/45	200cc	favorable
15. Terrier	4 yrs.	103	metritis	fair	17	10/29/45	200cc during operation	favorable
16. Mule	5 yrs.	100	injury	poor	1000	11/4/45	A.M. 600cc P.M. 400cc	favorable
17. Pointer	6 yrs.	99.2	parasitism	fair	45	12/3/45	125cc	favorable
18. Cocker	3 yrs.	99	internal injury	fair	35	3/5/46	125cc	favorable
						3/6/46	200cc	nervousness
19. Pointer	8 yrs.	100.2	shot injury	poor	60	3/4/46	150cc	poor
						3/6/46	200cc	favorable
20. Setter	2 yrs.	101.2	casarean	fair	75	1/12/46	125cc during operation	favorable
21. Mixed Terrier	3 yrs.	97.8	injury	poor	20	1/13/46	75cc	unfavorable (ruptured spleen)
22. Mule	5 yrs.	101.4	lipoma	fair	900	1/20/46	700cc during operation	favorable
23. Manchester Terrier	3 mo.	101.4	enteritis distemper	poor	4	1/25/46	10cc	improved
						1/26/46	20cc	died later
						1/27/46	25cc	(convulsions)
24. Mule	9 yrs.	101	nasal polyp	good	1000	2/5/46	1200cc	favorable
25. Boston	8 yrs.	101.4	mammary tumors	fair	20	2/7/46	100cc	favorable
26. Horse	4 yrs.	101.2	injury	fair	800	2/10/46	1000cc	favorable
27. Hound	3 yrs.	100	pyometritis	fair	50	2/12/46	250cc	favorable
28. Setter	12 yrs.	99.6	pyometritis	poor	60	2/14/46	200cc	favorable
29. Mixed	4 mo.	101	jaundice	fair	12	2/18/46	40cc	favorable
30. Terrier	3 yrs.	97.8	anemia parasites	poor	35	2/28/46	100cc	favorable
						3/1/46	125cc	
31. Scottie	6 yrs.	98.8	injury	poor	20	2/6/46	100cc	died
32. Mixed	3 yrs.	101	hernia	fair	35	5/10/46	150cc	favorable
33. Mixed	6 yrs.	98.4	amputation	poor	50	6/8/46	200cc	shock
						6/8/46	150cc	favorable
34. Retriever	5 yrs.	100	malnutrition	fair	90	6/30/46	350cc	
						7/1/46	300cc	
						7/3/46	500cc	favorable
35. Cocker	7 yrs.	101.4	pyometritis	poor	35	7/6/46	150cc	poor
						7/7/46	175cc	favorable
36. Mixed	2 yrs.	99.2	punctured jugu. vein	poor	25	7/20/46	125cc	
						7/21/46	150cc	favorable
37. Cow (Holst.)	4 yrs.	98	injury	poor	900	8/10/46	120cc	died
38. Police	2 yrs.	101	anemia	fair	65	9/12/46	125cc	favorable
39. Horse	8 yrs.	101.4	injury	poor	1000	10/15/46	1300cc	favorable
40. Cow (Holst.)	6 yrs.	101.6	cesarean	fair	1100	10/26/46	1500cc	favorable
		105.8	metritis	fair		11/28/46	1200cc	favorable

conditions where blood plasma is indicated in that it has an influence on the equilibrium in the distribution of plasma proteins between circulating blood and tissues and the resulting maintenance in osmotic pressure.

Comment On the Cases in Table I

1. This cow was shipped under very unfavorable conditions; in inclement weather without water. Upon arrival at our hospital she was much dehydrated. Penicillin was used in association with gelatin solution as supportive treatment.

2. In this case of poisoning, gelatin solution apparently aided in returning fluids to the body. This dog vomited excessively and was greatly dehydrated.

4. This individual was in poor flesh to the point of emaciation. Circulatory and respiratory stimulants with the aid of gelatin solution brought about a favorable response.

6. A blood transfusion (100cc) was given immediately to this animal and two injections of gelatin solution in association with proper feeding aided in eventually giving minimum doses of anthelmintics.

7. Saline and penicillin were given this case in its early stages. Later extreme dehydration and a general weakness prompted the use of gelatin solution. Post-mortem examination revealed oil in the lungs, which was explained by a late history.

8. Spoiled food produced excessive vomition in this case. The case was chronic, when treatment was given. Gelatin solution was used to correct dehydration.

9. Similar treatment was used in this case. The cause here was not determined.

10 & 11. Severe hemorrhagic enteritis and eventual dehydration was observed in these two cases. The sulfa drugs, principally sulfathiazole and sulfathalidine, and intestinal antiseptics and astringents were used. Gelatin solution was used to combat dehydration and hemoconcentration.

13. Possibly this case was leptospirosis in its later stages. Penicillin, circulatory and respiratory stimulation were used, aided by gelatin solution as supportive therapy.

17. In this case miscroscopic examination revealed a heavy infestation of hookworm. Gelatin solution was used here in an attempt to re-establish water and electrolyte balance and thus prepare the animal for anthelmintic treatment.

23. Sulfaguanidine and vitamin therapy was used in this case. Gelatin solution was used in the later stages in an attempt to replace the lost body fluids.

29. There was a heavy infestation of ascarids in this case, with possible occlusion of the bile duct. Extreme dehydration was present. At a later date N-butyl chloride was given with favorable results. Gelatin solution was used as supportive therapy.

30 & 38. A grave infestation of hookworm and a definite hemoconcentration. These two cases were given a proper feeding program and intravenous injections of 5% glucose. Gelatin solution apparently aided in readjusting body fluids by exerting a satisfactory colloidal osmotic blood pressure effect. This treatment was followed in three days with N-butyl chloride.

34. This individual was heavily infested with external parasites and was on a very poor diet. The external parasites were removed and glucose injections were employed with gelatin solution as supportive treatment.

40. Penicillin in saline was used intravenously and penicillin in oil was used intramuscularly in this case. Sulfanilamide was administered orally. Gelatin solution was given in two different injections and the general condition of the case seemed greatly improved.

In the foregoing cases there are possibly some in which the gelatin solution was not indicated. My use of the gelatin solution was that of an experimental preparation. In some of these cases I feel that it was definitely of value while in others it was not.

In the cases of shock and loss of blood, attempts were made, whenever possible, to use only the gelatin solution rather than have its action confused with other preparations having a similar action.

The following tabulation shows a grouping of the cases listed in Table I according to etiology.

Recapitulation

Group 1 Shock	Group 2 Loss of Blood	Group 3 General
3	16	1
5	18	2
12	19	4
15	21	6
20	24	7
22	26	8
25	31	9
27	36	10
28	37	11
32	39	13
33		14
35		17
		23
		29
		30
		34
		38

References

1. Hogan, J. J. The intravenous use of colloidal (gelatin) solutions in shock. *J. Am. Med Assn.*, 64, p. 721. 1915.

2. Wolfson, W. L., and Teller, F. Intravenous use of gelatin solution in hemorrhage; experimental study. *Am. J. Med. Sci.*, 178, p. 562. 1929.

3. Milks, H. J. Practical Veterinary Pharmacology, Materia Medica and Therapeutics. Fourth edition, Alexander Eger, Chicago, pp. 359-360. 1940.

4. Kozoll, D. D., Popper, H., Steigmann, F., and Volk, B. W. The use of gelatin solution in the treatment of human shock. *Am. J. Med. Sci.*, 208, p. 141. 1944.

5. Kleinberg, W., Remington, J. W., Eversole, W. J., Overman, R. R., and Swingle, W. W. The effectiveness of plasma, gelatin and saline transfusions in preventing shock induced by leg muscle trauma and tourniquets. *Am. J. Physiol.*, 140, p. 197. 1943.

6. Evaluation of studies on gelatin preparations for intravenous use. Special Rept. from The Nat. Research Council, *J. Am. Med. Assn.*, 125, p. 284. 1944.

7. Kozoll, D. D., Popper H., Steigmann, F., Volk, B. W., and Meyer, K. A. Gelatin solution as plasma substitute. *Am. J. Clin. Path.*, 15, p. 223. 1945.

Veterinary Problems of the Fur Ranch

By T. T. CHADDOCK, M.S., D.V.M.

"It Is Believed That They Will Do Well"

A recent editorial in the *Black Fox Fur Magazine* mentions a small notation in a 26-year-old journal in which it was stated that Fromm Brothers of Hamburg, Wisconsin, had purchased 16 pairs of silver foxes. Of particular interest was the statement: "It is believed that they will do well."

From what today would be considered a humble start, Fromm Brothers have become the greatest producers of fox and mink in the world. Supporting this statement is the fact that last year they raised approximately 35,000 foxes and well over 20,000 mink. "It is believed that they will do well." What do you think?

The Silver Fox Industry as It Affects the Veterinarian

Today the raising of silver foxes is a losing venture. Present market prices are not sufficiently attractive to induce people to produce them, in fact many small ranchers are going out of the business. The average pelt price last fall was from $11 to $15 and at present it is but little better.

The cost of production is approximately $27 per animal. From these figures it can readily be seen that every fox marketed represents a $10 to $15 loss to the raiser.

The importation of two million dollars worth of foreign furs into this country along with a rise in the cost of production, especially food and labor costs, has forced many ranchers to pelt out. This in turn has glutted the market with silver fox pelts to an extent that there is little movement of them on the fur market. Many ranchers are still holding last year's pelts with little possibility of their disposal.

The fox farmers faced with the present unstable conditions are very hesitant about spending any money on their foxes, even in the control of infectious diseases. For instance, they are willing to take their losses from outbreaks of distemper in the hope that they will be able to salvage a few of the best animals for breeding stock.

When a veterinarian is called in to render a service, he is placed at a great disadvantage as he will be faced with many obstacles not heretofore existing.

Some of these are:

1. Poor husbandry methods, such as the lack of anthelmintic treatment and poor sanitary measures.

2. The feeding of an unbalanced diet; *e.g.*, one rancher seen recently was feeding his foxes on nothing other than ground wheat. I am unable to tell how these animals survived on such a diet.

3. Deterioration of ranch machinery and pens without a thought of making repairs.

4. Lack of cooperation on the fur rancher's part, which is mostly due to the unsettled state of the fur market. Many times these gentlemen will question the veterinarian's decisions and become very argumentative over trivial matters, for no other reason than that they are jittery about the whole business.

5. In some instances the nonpayment of bills for services rendered will plague the veterinarian.

These statements are cold blooded facts as they exist today throughout the North American continent. Veterinarians should take cognizance of this situation and realize that they are limited in the treatment of sick animals of the fur industry as the client will insist that the work be done as cheaply as possible.

Shipments of Fur Animals by Air

Of the many, varied shipments by air, one of the most valuable last year was from a fur ranch in Michigan to Norway. The owner contemplated selling 200 choice breeding minks and consulted me about the affect of altitude on the animals. My reply was I had observed mink in the Rocky Mountains of Montana at an elevation of 10,000 feet, but of course these animals had become acclimatized to that elevation.

During the flight to Norway the chartered plane encountered several storms which compelled it to ascend to 14,000 feet. According to the owner, who became very excited about his valuable shipment, the mink curled up into small balls and went sound asleep. He thought they were dead and could scarcely believe the evidence of his eyes, when the plane landed and all animals were seen to be very much alive and looking for something to eat.

He stated the cost of chartering a plane for the trip was $30,000, but that a shipment of race horses from England to a state in the middlewest on the return trip reduced the fee to $15,000. The only one who suffered from the trip was an attendant who celebrated his good fortune in being selected for the trip a little too freely just prior to the hurried take-off.

Clinical Reports

Large Cystic Calculus in a Dog Nine Months of Age

The subject was a nine-month-old female Cocker Spaniel. A diagnosis of tumor in the abdominal cavity had been made by another veterinarian.

The animal presented the following symptims when brought in for treatment: Frequent attempts at urination, followed by a dribbling of bloody urine. Upon palpation a freely moveable round object anterior to the pelvis was located. A diagnosis of cystic calculus was made after a fluoroscopic examination (Fig. 1). The dog was given 10 grains of methenamine *per os* on the first day and food was withheld. At 8:00 a.m. the following day 10 grains of methenamine was given and this was repeated at 3:00 p.m.

An operation was performed on the afternoon of the second day (March 31st).

Operative procedure.—The patient was confined in dorsal recumbency. An area extending four inches anterior to the pelvis and one inch posterior to the pelvis was scrubbed,

X-ray photograph indicating: *a*, cystic calculus; *b*, urinary catheter

cleaned and disinfected. Ether anesthesia was administered. An incision extending three inches anterior to the pelvis was made through skin, muscle, and peritoneum. The bladder was brought through this incision and the dorsal surface was exposed. An incision was made through the bladder, the wall of which was thickened to twice the normal thickness. The calculus was removed and the bladder was irrigated with saline solution. Czerny-Lembert sutures were used to close the bladder incision. The omentum was tacked onto the bladder over the dorsal surface, using interrupted sutures. The incision through the peritoneum was closed using interrupted figure eight sutures. The muscle edges were brought into proximity. The skin edges were brought into apposition using alternate mattress and interrupted sutures. A sulfanilamide pack was applied to the wound and the area bandaged.

After treatment.—Beginning at 10.00 p.m. of March 31st, five grain doses of methenamine were given every six hours until five doses had been given.

The dog was returned to her owner April 2d. Although cystic calculus in a dog is not uncommon, the size and weight of this one in a dog is unusual. The calculus weighed 1.02 ounces and had a diameter of one and three-eighths inches.

DAVID EISENBERG

Bronx, New York

Empyema of the Frontal Sinus in a Cow

April 29, 1947, a four-year-old, Guernsey cow showing marked dyspnea was presented for treatment with the following history:

The owner had been in possession of the cow approximately one year. She had been bred and at the end of the fourth month of gestation he noticed that she was beginning to show slight symptoms of dyspnea. He assumed that the dyspnea was due to the advancing pregnancy. Respiration became progressively more difficult and he soon noticed a heavy mucous discharge from the left nostril. In due time the cow calved normally and as the respiratory symptoms persisted she was brought to the clinic.

Upon examination the cow was found to be in an advanced stage of dyspnea with no passage of air through the right nasal passage. There was a slight swelling over the turbinate portion of the frontal sinus. A rubber stomach tube was gently passed into the right nostril and into the nasal cavity toward the frontal sinus. After gentle manipulation a slight discharge of yellow, pus-like, putrid material was obtained.

A diagnosis of empyema of the turbinate portion of the frontal sinus was made and surgical interference advised.

The animal was restrained on an equine operating table. The operative area was determined by passing the thumb and finger up on each side of the nasal bones. The point of divergence was the area decided upon. By doing this, bottom drainage through the nasal cavity would be within reach. An area about two inches square was shaved, painted with tincture of metaphen and infiltrated with a

1% solution of procaine hydrochloride. A trephine opening through skin and bone into the sinus was made. Upon reaching the sinus it was found to be completely occluded with pus, appearing as yellow, thick, heavy clumped masses, and necrotic material. A putrid odor emanated from the opening due to the necrosis of the sinus and nasal mucous membranes and retention of pus within the sinus. Ordinary flushing of the sinus was not immediately possible. The material was inspissated and it was necessary to break up the mass with a blunt instrument.

With the aid of a dose syringe the sinus was flushed with a 2% solution of potassium permanganate. Drainage was obtained through the trephine opening and bottom drainage through the nasal cavity. The external opening was packed with gauze and the animal was released from the table. Two hours later, breathing normally and apparently relieved, the cow was sent home.

Later the owner reported that the cow had completely recovered.

GABRIEL NOSSOV

New York, N. Y.

Ethyl Mercury Phosphate Poisoning in Cattle

The owner of a herd of grade Shorthorn stock cows discovered one of them dead in the pasture. While driving the remainder of the herd to the barnyard, two more cows suddenly staggered, went down in convulsions, and died about 15 minutes later. The following morning the owner noticed a fourth cow staggering and, beginning to suspect that something might be wrong with his cattle, called a veterinarian. When the veterinarian arrived still another cow was down.

Neither of the cows that were down and unable to rise showed any deviation from normal in temperature. They were extremely hyperesthetic and went into clonic spasm at the slightest touch or noise. One of the cows exhibited extreme dorsal curvature of the neck.

Autopsy of the two cows that had died on the way to the barn the preceding evening revealed ecchymotic hemorrhages on all serous surfaces. The kidneys were congested and friable. The liver was slightly swollen. There was no evidence of any inflammation in the digestive tract. Except for the hemorrhages, the organs in the pleural cavity were normal.

Questioning the owner revealed that he had emptied some treated seed oats around some recently constructed ponds in the pasture. On inquiry at the local elevator it was found that the material used for treating the oats was a proprietary product, ceresan, of the Du Pont de Nemours company containing ethyl mercury phosphate as the active ingredient. Removal of the cattle from the pasture stopped the loss.

This chemical has come into wide use throughout all parts of the country as a fungicide for treating a wide variety of seeds. There have been one or two reports of poisoning in swine from this product. Although there have been other reports of poisoning by this product, it is unfortunate that no chemical examination was made following the necropsies.

K. B. MIDDLETON

Villisca, Iowa

New Strongyloides Species

March 20, 1947, a brown and white male, German Shorthaired Pointer, seven months of age and weighing about 40 pounds, was admitted to the clinic having a history of no appetite, running eyes, and a cold.

His temperature was 103.2° F. He was very thin, being on the borderline of emaciation, had a cough, purulent eye discharge, and two denuded areas on the right side and hip. A specimen of the feces was put under the microscope, and a number of larvae were found. These were slender forms about 300 microns long, fairly active, though only slightly motile. The specimen was taken to Dr. Ross L. Jewell of Kansas State College who identified it as the larva of *Strongyloides stercoralis*. This identification was later confirmed by Professor J. E. Ackert.

This finding of *Strongyloides stercoralis* larvae is of considerable interest because it seems to be the first case of natural infection in dogs reported from this state as well as the first in the Middle West. This dog had never been out of Kansas. The first infection of this kind in a dog was observed in China by Fulleborn (1914), and the second in India by Ware (1923). Since that time it seems to have spread to the United States, for according to John T. Lucker (1942), Strongyloides infection in dogs has been reported, but only in states bordering on the Atlantic Ocean—Connecticut, North Carolina, New York, Maryland and Virginia.

Meanwhile, a diagnosis of bronchitis and demodectic mange had been made. The bronchitis was apparently due to the irritation caused by the wanderings of the larvae from the lung up the bronchi.

A guarded prognosis was given since no specific treatment is known, and a fatal case has been reported (Ware).

Symptomatic treatment was instituted. On the first day the animal was given 20cc of

Pitman-Moore's Biologic No. 660, 20,000 units of penicillin and 20cc Di-Sulfalac intravenously. The penicillin was repeated together with 15 grains of sulfathiazole *per os* that same evening. The next morning the previous medication was repeated. During the afternoon the following was administered: 20,000 units of penicillin intramuscularly, 15 grains of sulfathiazole, 15 grains Di-Cal-D (Abbott), one iberin capsule (Abbott) and 50,000 units of vitamin A *per os*. Canex was applied to the demodectic areas. During the next three days the dog was treated thrice daily with penicillin and sulfathiazole and also given vitamin A and calcium. At the end of this period he was discharged from the clinic though he still had larvae of *Strongyloides stercoralis* larvae in his feces.

April 3, 1947, he was readmitted to the clinic with an enteritis which was believed due to the action of the *Strongyloides stercoralis*.

Larva of *Strongyloides stercoralis* is 2.2 mm long by 0.034 mm wide. An egg measures 45-55 by 26-35 microns

His temperature at this time was 103° F. This condition was also treated symptomatically. He was given an enema with a gallon of water containing 1% sodium bicarbonate and injected intramuscularly with 15,000 units of penicillin. Then aloxide ($Al_2[OH]_3$) was given, ½ ounce *per os* daily for the next week. At the same time, an attempt was made to build up the condition of the dog. This was continued until the 14th of April, when the following were administered: triple sulfacarbolate 15 grains and bismuth subnitrate added to make two drams, one iberin capsule, and two Di-Cal-D capsules of 15 grains each.

The above treatment eliminated the enteritis but had no effect upon the parasitic infestation, since the larvae were still to be found in the feces. Since nothing further could be done the dog was discharged.

May 18, a fresh fecal sample was obtained and the larva were again found and photographed (Fig. 1).

The dog appears to be in good health, no symptoms being shown at the time the fecal sample was obtained, and has gained weight since his discharge from the hospital. Therefore, this strain of *Strongyloides stercoralis* does not appear to be seriously pathogenic.

It does not seem to be advisable to alarm the owners of dogs thus afflicted, since experimental transmission from dog to human has not been demonstrated (Augustine and Davey), although Strongyloides of human origin can be transmitted readily to dogs and cats under laboratory conditions.

Bibliography

Augustine, D. L., and Davey, D. G. Observations on natural infection with strongyloides in dogs. *J. Parasit.*, 25, pp. 117-119. 1939.

Chandler, A. C. A case of canine strongyloidiasis in Texas. *J. Parasit.*, 29, pp. 157-158. 1943.

Dikmans, G. *Am. J. V. Res.*, 7, pp. 211-241. 1945.

Faust, Ernest C. Amebiasis in New Orleans population as revealed by autopsy examination of accident cases. *Am. J. Trop. Med.*, 21, pp. 35-48. 1941.

Headlee, Wm. H., and Cabel, R. M. Intestinal parasitism among students of Berea College. *Am. J. Trop. Med.*, 22, pp. 351-360. 1942.

Lawler, H. J. The relation of vitamin A to immunity to strongyloides infection. *Am. J. Hyg.*, 34, pp. 65-72. 1941.

Lucker, J. T. The dog strongyloides, with special reference to occurrence and diagnosis of infections with the parasite. *Vet. Med.*, 37:3, pp. 128-137. 1942.

Monnig, H. O. *Veterinary Helminthology and Entomology*. Williams & Wilkins, Baltimore. 1938.

Reardon, Lucy V. Incidence of *Endamoeba histolytica* and intestinal nematodes in a Georgia state institution. *J. Parasit.*, 27, pp. 89-90. 1941.

Young, Martin D. The incidence of intestinal parasites in a selected group at a mental hospital. *J. Parasit.*, 27, pp. 71-74. 1941.

HAROLD K. COHEN

Trenton, N. J.

Prevent Unnecessary X-Ray Exposure

It is only within recent years that veterinarians in large numbers have been using X-ray equipment in their daily practice. Recent surveys indicate that some do not realize the potential danger to themselves in the way they employ their machines. It is the purpose of this article to point out how these machines can be used safely.

A person cannot feel it when he is being exposed to roentgen radiation. Herein lies the danger. The physiological effects do not appear until after three days form even large doses. In most cases of repeated very small doses the effects may not appear for years. The effect of small doses is accumulative. This is of utmost importance to the doctor because if he does not take the necessary *daily* precautions he may receive small amounts of

radiation each day, until a harmful total is built up.

The hands should never be exposed to the radiation. When making radiographs the practice is to immobilize the animal or have the owner restrain it.

Fluoroscopy presents the greatest danger. Many veterinarians are using hand type fluoroscopes which provide *very little* protection to the user. These hand units should not be used without leaded rubber gloves. In addition it is best to wear a leaded apron. The gloves and the apron should be checked at least once a year for cracks and leaks. This should be done by an outside expert on X-ray equipment, not the owner.

Following are suggestions that will be helpful in preventing exposure in the daily use of x-ray units.

1. Use as low kilovolts as possible.
2. Keep the field as small as possible by the use of cones or a diaphram if the machine is so equipped.
3. Keep the lead glass screen directly in front of the user.
4. Reduce the total exposure to the shortest time which will serve the purpose.
5. Never use bare hands to palpate. Wear gloves.
6. Stand as far from the machine as possible.
7. Never stand in line with the tube port. Stand behind the tube or machine.

Modern X-ray machines are so built that all radiation must come out through the port or window. This makes it easy for the doctor to direct and control the X-ray beam. If he recognizes the potential hazard and controls it, the X-ray machine becomes a tool rather than a weapon.

VICTOR PETERSON,
Chicago, Ill. X-ray Physicist

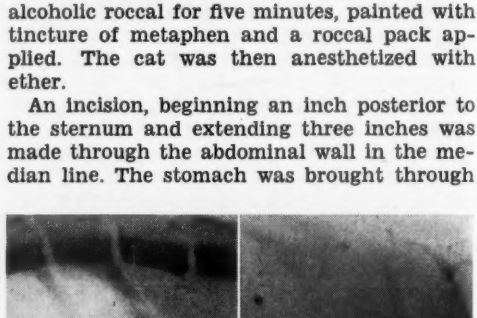
Feline Gastrotomy

History.—A three-year-old cat of unknown ancestry was presented at the clinic with a history of having a piece of fishing cord hanging from its mouth which later disappeared. The owner had noted that the patient had clawed at its mouth while trying to eat, and was under the impression that he had swallowed a fish hook.

Diagnosis.—Examination revealed no clinical symptoms of an obstruction. No foreign object could be located on palpation, nor was any pain observed. The patient was then fluoroscoped with better success for lying in the stomach was a fish hook of medium size. Two X-ray photographs were taken, one a lateral aspect the other ventro-dorsal aspect. Following development and study of the radiographs the patient was prepared for surgery.

Operative Procedure.—The patient was restrained in dorsal recumbency. An area three inches wide and seven inches long extending from the xiphoid region to the iliac region was shaved, scrubbed with 1:100 solution of alcoholic roccal for five minutes, painted with tincture of metaphen and a roccal pack applied. The cat was then anesthetized with ether.

An incision, beginning an inch posterior to the sternum and extending three inches was made through the abdominal wall in the median line. The stomach was brought through



The shank of the fish hook was more than an inch long

the opening and the fish hook was palpated easily. An incision was made in the greater curvature of the stomach and with a pair of forcepts the fish hook grasped and removed. The incision in the stomach wall was closed with Czerny-Lembert sutures and a portion of omentum tacked over the incision to prevent adhesions. The stomach was then returned to the abdominal cavity. The abdominal incision was then closed with interrupted sutures through the skin, muscle and peritoneum. The skin was approximated with mattress sutures. A sulfathiazole pack was applied to the incision and held in place with stockinette.

Post-Operative Care.—Food and water were withheld for the first 48 hours. Intraperitoneal injections of 250cc normal saline solution containing 5% dextrose were given twice daily as a substitute for food and drink. The cat was then given milk for the second 48 hours. On the fifth day following the operation the animal was placed on a normal diet, the sutures removed and the animal discharged. An uneventful recovery followed.

Wichita, Kans. LEROY E. DIETRICH

Book Reviews

History and Romance of the Horse. By *Arthur Vernon.* Illustrated by *Ernest John Donnelly.* 525 pages; many illustrations. Published by Dover Publications, New York, 1946. Price $3.50.

This is an absorbingly readable work. No matter what the reader's interest in horses there is something in this book for him. For the naturalist and antiquarian there is the development of the horse over 45 million years and five continents; for interest in the medieval horse and man and nations, there are the Crusades and Genghis Khan and Knights Errant; in this country, coach horses, covered wagons, the pony express, the Indian pony, the cow horse, the mustang, wild horses and dude ranches; the glorified horse of Hollywood and the glamour horse of racing stables; for the sportsman the race horses from Roman chariot races to the Kentucky Derby and polo through the ages. Breeds and strains canter through the pages from Godolphin Barb to present-day breeds and champions. The exploits of cavalry are reviewed from Alexandre of Macedon to its mechanization. A complete history of the horse from eohippus to Man o' War, and much about his junior partner—man.

Diseases Transmitted from Animals to Man. By *Thomas G. Hull,* Ph.D., Director, The Scientific Exhibit, American Medical Association; assisted by 14 contributors. Third edition; 571 pages; 75 illustrations. Published by Charles C. Thomas, Springfield, Illinois; 1947. Price $10.50.

From a veterinary viewpoint the first edition of this work left much to be desired; the second edition was greatly improved and still further improvement characterizes this edition. In the publisher's words, "It presents 91 important diseases which mark a common meeting ground where physicians, veterinarians, health officers, laboratory workers, specialists in animal and dairy husbandry, zoologists, biologists and immunologists can each understand the problems of the others and by concerted action, reduce the number of infections which man contracts from animals."

Notwithstanding any serious disease is important to the person who has it, by no means all these 91 diseases are important statistically—at least among western nations. Nor does the text concern in equal degree all the professions mentioned, veterinarians, physicians, public health officials and research workers being the classes mainly concerned with the problems treated in the text.

Of the 14 contributors to this volume seven are veterinarians—Wm. H. Feldman, Robert Graham, Wm. A. Hagan, I. Forest Huddleson, R. A. Kelser, C. D. McGilvray and Karl F. Meyer. Their contributions are among the most extensive and most important in the text—tuberculosis, listerellosis, pox and pox-like diseases, brucellosis, rabies, glanders, ornithosis (psittacosis) and others. Other essentially animal diseases treated exhaustively include: anthrax, salmonellosis, foot-and-mouth disease, trembles, contagious ecthyma, the encephalitides and infections produced by animal parasites.

The diseases are grouped into those of domestic animals, of rodents and wild animals, human disease spread by animals, and diseases of which animals are passive carriers. Rather surprisingly tetanus is included in the last group, which is correct, but omitted from the first group. Botulism and malignant edema also are classed among the diseases of which animals are passive carriers.

There are 67 tables which increase the scope and usefulness of the work. Among them are listed 10 diseases including two parasitisms that man acquires from horses; 29 diseases including 12 parasitisms from the cow; 15 including 10 parasitisms from swine; 18 including six parasitisms from sheep; 33 including 18 parasitisms from the dog; 16 including 13 parasitisms from the cat; 20 including six parasitisms from rats and mice, and 17 diseases from domestic and wild birds. Salmonellosis acquired from ducks and erysipeloid from turkeys are not mentioned.

The time required to get material into a text is indicated by a June publication date, yet it is stated that foot-and-mouth disease does not occur in Mexico and pulling up white snake root instead of spraying with 2,4-D is the means recommended for ridding pastures of the weed.

This is an excellent text—a must have for veterinarians in public health work and, although a bit disastrous on the pocketbook, well worthwhile for veterinarians in practice, research work and teaching.

Milk and Food Sanitation Practice.—By *H. S. Adams,* B.Sc., Chief, Bureau Environmental Hygiene, Division of Public Health, Minneapolis, and Lecturer, School of Public Health, University of Minnesota. 311 pages; 63 illustrations. Published by The Commonwealth Fund, New York, 1947. Price $3.25.

This reasonably priced volume contains a great deal of information on milk and on general food hygiene, most of it quite elementary. The elementary nature of the work perhaps is to be expected, since the text is designed "to help food sanitarians" whom the author envisions as persons without professional education or training, but prepared for their duties by a few lectures and motion picture reels. Even so, one can't see the need

for such ponderous platitudes as: "If raw milk is to be sold it should be surrounded with all possible sanitary safeguards" and "Milk ranks high in digestibility," also, "Milk, from an economic viewpoint, occupies a significant place in American agriculture" and "All milk sold raw should, of course, come from disease-free herds."

Contradictions sometimes occur, thus detailed directions are given for creating a public preference for the pasteurized product and for inducing processors to discontinue the distribution of raw milk. Then the author concludes "during this transitory period the sanitarian should work continuously toward a Grade A raw milk supply." If anyone has discovered a more effective means of preventing a change from raw to pasteurized milk than to label the former "Grade A" he has not made his discovery public.

Any book reviewed in these pages, or any other book if available, may be obtained by remitting the published price to VETERINARY MEDICINE, 7632 S. Crandon Ave., Chicago 49. Bulletins and Circulars should be requested direct from the address given in the notice. Generally they are supplied free unless a price is stated.

The directions given for dairy farm sanitation are sketchy and disjointed. Maintaining the health of the dairy herd is touched upon even more lightly than barn and milk house sanitation and, in most instances, the type of sanitarian the author has in mind could not do anything about the duties outlined for him. For example: "The milk sanitarian should check carefully with herd owners to make sure that the necessary precautions (against bovine tuberculosis) are taken so that an occasional positive animal is not admitted to or is not present in a herd." And again: "The milk sanitarian's interest in Bang's disease *(sic)* is two fold: first to reduce the danger to persons consuming raw milk and other dairy products from infected cows; and second, to prevent the spread of the infection from one herd to another." That will be a considerable task for the milk sanitarian. The milk sanitarian's major interest in mastitis is said to be prevention and he "must be able to recommend measures to be followed." He is "directly concerned with the control and possible elimination of mastitis from the herd," but for the latter course of action he should "advise the producer to engage the services of a veterinarian." If the author has the slightest knowledge of the tremendous service to milk hygiene the veterinary profession has rendered in suppressing bovine tuberculosis he successfully conceals it. If he has any conception of the skill and experience required in diagnosing and handling mastitis on a herd basis, that too is completely withheld from his readers. The author has heard of the inspection of foods shipped interstate by the Food and Drug Administration and of the inspection of oysters by the U. S. Public Health Service, but the Federal Meat Inspection Service has completely escaped his ken.

Despite the shortcomings mentioned, this work contains a vast amount of authentic information. Veterinarians will find it useful as a reference for statistical and historical material, for methods of dealing with the public in the matter of food hygiene, for conducting surveys and educational campaigns and for a very complete review of the literature on food hygiene and food inspection.

* * * *

Housebreaking the Dog. By *Capt. Will Judy,* editor of *Dog World Magazine,* author The Dog Encyclopedia, Training the Dog, etc. Paper covers; 14 pages. Seventh edition. Published by Judy Publishing Co., Chicago; 1947. Price 30 cents.

This is one of Judy's well known series of 12 dog booklets. It answers many questions that veterinarians are asked daily. The author describes it as a work on internal sanitary engineering, essentially upon a psychological rather than a physiological basis.

* * * *

Bulletins, Circulars, Reports, Etc.

How to Control Fleas. Leaflet No. 152 USDA, Washington 25, D. C.

Revised Feed Formults for Chickens. AIS-57 USDA, Washington 25, D. C.

Cattle Grubs in Montana. Bulletin 437, Montana State College, Bozeman.

Dairy Cattle Housing, in the North Central States. Bulletin 470, Wisconsin Agr. Exp. Sta., Madison.

The National Poultry Improvement Plan. USDA Miscl. Cir. No. 3 DO. Available from the Supt. of Documents, U. S. Government Printing Office. Price 10 cents.

Report, Poultry Improvement Board. —Sixth and seventh annual reports of the North Dakota Poultry Improvement Board. State Veterinarian, Bismarck, N. D.

Parasitic Diseases of Cattle. Section III of a report on diseases of farm livestock, 63 pages, issued by the National Veterinary Medical Association of Great Britain and Ireland, 36 Gordon Square, London, W.C. 1, England. Price not stated.